

MAY 21 1945 117

THE *Refrigeration* Industry

INSTALLATION
MAINTENANCE
MERCHANDISING

AIR-CONDITIONING
MACHINERY

MAY, 1945



★ ★ ★ ★ ★
IN THIS ISSUE:

{ Coldspot Rebuilding... They Know Their Way Around
Sell Locker Plant Efficiency - - Forget About Price!
It's Not as Tough as It Looks... Postwar Markets

Improved

REFRIGERATION DRYERS

Weatherhead dryers using Silica Jel are made in both the rechargeable and non-rechargeable types. No felts or organic filters are required. Instead, a generous number of fine mesh stainless steel screens are used. Full flow is assured even at zero temperatures. The Weatherhead line of *improved* refrigeration products is available now.



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BRANCH OFFICES: NEW YORK • PHILADELPHIA • DETROIT • CHICAGO • ST. LOUIS • LOS ANGELES

In addition to refrigeration dryers, Weatherhead also manufactures complete lines of valves, manifolds, fittings, drain cocks and other products for the following industries:

AUTOMOTIVE

★

REFRIGERATION

★

RAILROAD

★

MARINE

★

FARM EQUIPMENT

★

ROAD MACHINERY

★

DIESEL

★

L. P. GAS

★

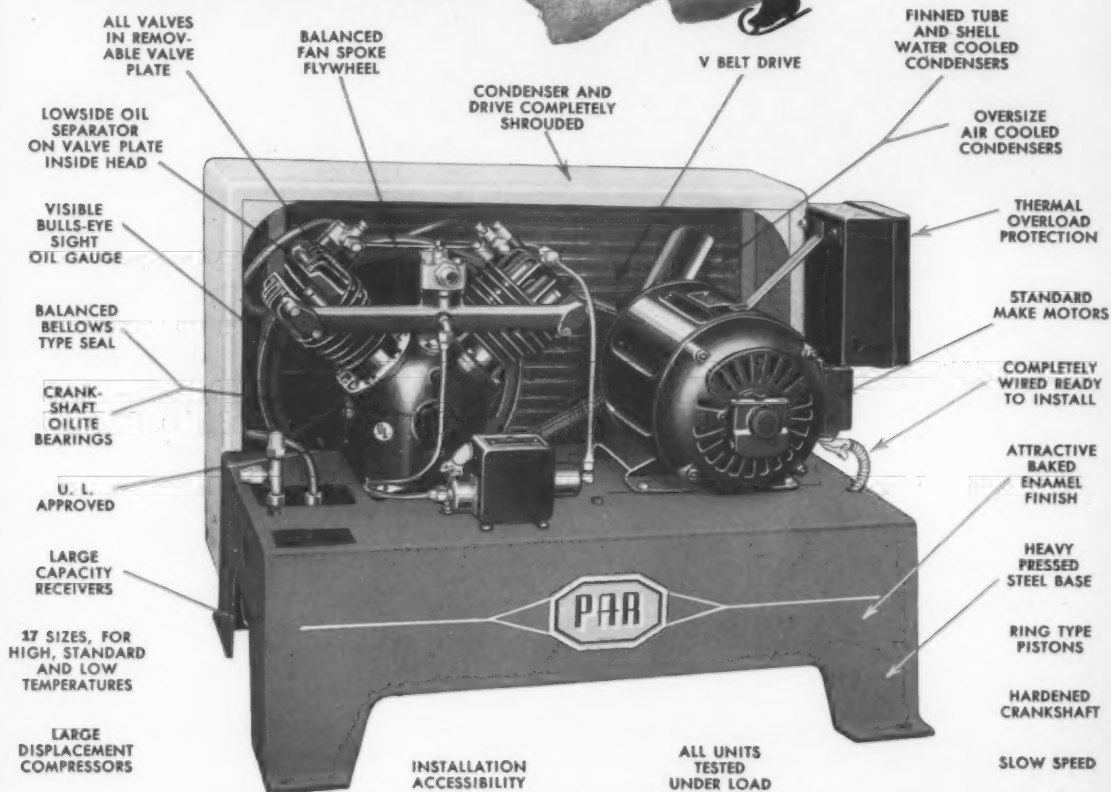
APPLIANCE MANUFACTURERS

Free

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**24 OUTSTANDING
FEATURES**
built in every
PAR CONDENSING UNIT

PAR BY *Lynch*



Know PAR . . . and you'll know why Par enjoys such unusual popularity among Jobbers, Servicemen and Users alike. Ask your Par Jobber for complete details on these PAR Features or write for Par catalogue R-96 and supplement.

**PAR—Condensing Unit Line sold exclusively
through Franchised Refrigeration Supply Jobbers!**

PAR
Lynch
DIVISION

. . . By Comparison — You'll Buy **PAR**

**Manufacturing Corporation, Defiance, Ohio
U. S. A.**

Here is the New MUELLER BRASS CO. REFILLABLE DEHYDRATOR



Readily Removable Inlet For *Easy Refilling!*

When recharging our new Dehydrator, simply remove the inlet plug—back out the slotted inlet screen tube—shake out the exhausted agent, then replace with new.

In addition to this convenient feature (see illustration above) Mueller Brass Co. Filters and Driers are provided with the CONE SCREEN OUTLET, a specially designed filtering element that adds immeasurably to the life and efficiency of Driers and Filters.

Almost all crystalline dehydrating agents are subject to a certain amount of abrasion while a dehydrator is in service. Small portions of the dehydrating agent break down into very fine powder and crystals. Unless a well-designed filtering element is incorporated in a dehydrator, these fine crystals and powder have a tendency to clog the outlet filter, resulting in restriction to the flow of refrigerant.

With the MBCO. CONE SCREEN OUTLET, such finer crystals and powder are forced to the base of the cone, leaving the center and tip of the screen open to the free flow of refrigerant.

In addition, the cone screen is filled with pure wool which traps such particles that are sufficiently fine to pass through the screen mesh.

Particular attention has been paid to screen areas in Mueller Brass Co. Filters and Dehydrators, so that each size permits efficient passage to the maximum refrigerant volume that is used in a particular size refrigerant line.

MUELLER BRASS CO. PORT HURON, MICH.

Here's the Inside Story

WHY Wagner REPULSION-START INDUCTION MOTORS ARE PREFERRED WHEN TROUBLEPROOF MOTORS ARE NEEDED

The inside story of the Wagner repulsion-start induction motor tells *why* this motor is troubleproof.

The heart of the repulsion-start induction motor is the rotor, which is so constructed that the motor starts as a repulsion motor and at a predetermined speed is automatically converted into an induction motor. This changeover is effected by a short-circuiting and brush-lifting mechanism shown in detail in the two small cross-section photographs below.

Since it is the rotor that makes the repulsion-start induction type of motor, a study of the rotor, as designed and built by Wagner, the pioneers of the repulsion-start induction type motor, will prove profitable to purchasers and users of single-phase motors.



THE ROTOR illustrated embodies the latest developments in design and construction as the detailed description indicates.

SKEWED SLOTS reduce magnetic noise, eliminate variation in starting torque at different positions of the rotor.

GOVERNOR WEIGHTS, formed of rust-proofed steel, when thrown outward by centrifugal force move pushrods which pass through rotor and actuate brush mechanism.

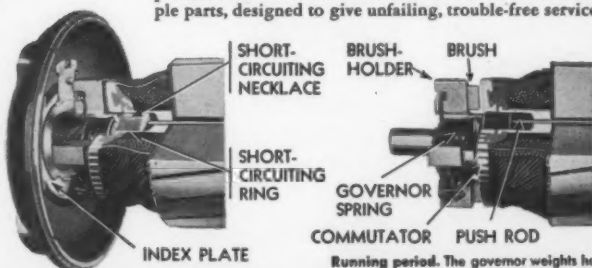
BLOWER is constructed of sheet steel punchings securely riveted together.

ROTOR WINDING is machine-wound, of heavy formvar-insulated wire and designed to fit the slots without crowding. It is effectively insulated from the rotor iron.

LAMINATIONS are punched from nonaging, high-grade electric sheet steel selected for its magnetic properties.

SHORT-CIRCUITING AND BRUSH-LIFTING MECHANISM

The short-circuiting and brush-lifting mechanism of Wagner repulsion-start induction motors consists of but a few simple parts, designed to give unflinching, trouble-free service.



Starting period. Short-circuiting necklace is not in contact with commutator bars. The governor spring holds spring barrel in starting position. Brush assembly completes selected circuits so motor starts as a repulsion motor.

Running period. The governor weights have actuated the pushrods, forcing the spring barrel forward until short-circuiting necklace connects commutator bars to short-circuiting ring. With all circuits short-circuited, windings form a "squirrel cage" to permit motor to operate as an induction motor.

MOTORS

are but one of several **WAGNER PRODUCTS** serving industry.

Other **WAGNER PRODUCTS**:
AIR BRAKES
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M45-11

Wagner Electric Corporation

ESTABLISHED 1891

6442 Plymouth Avenue, St. Louis 14, Mo., U. S. A.

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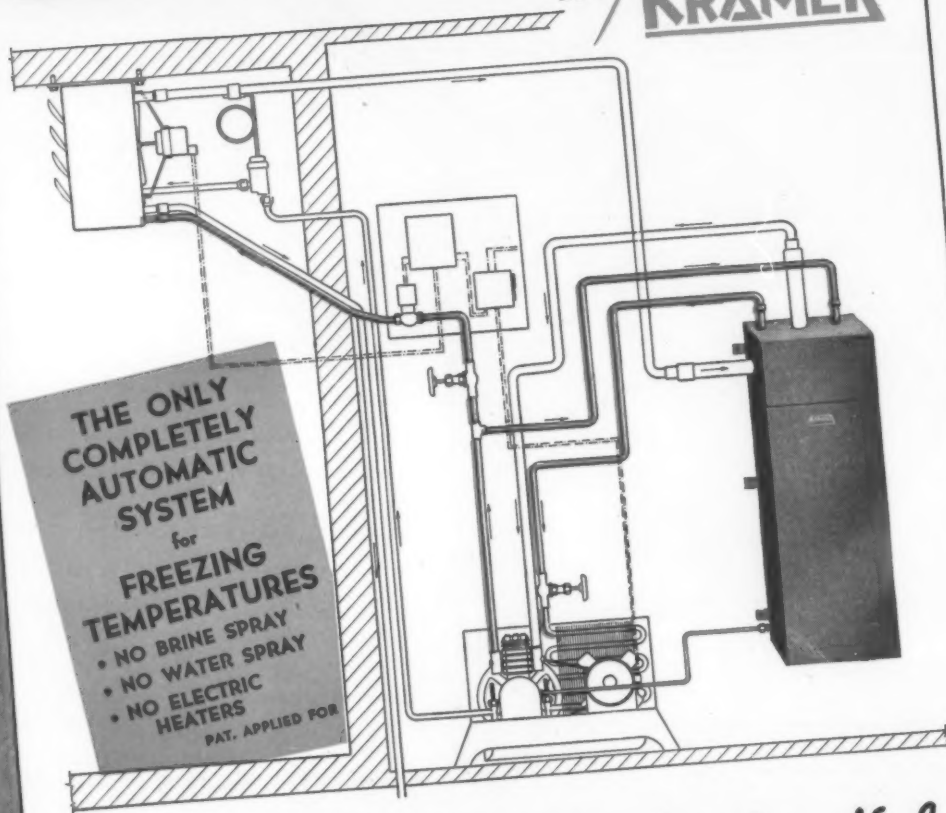


Remember these advantages of repulsion-start induction motors: They (1) can start high-inertia loads and accelerate them smoothly, (2) require lower starting current than other types of single-phase motors, and light flicker is therefore negligible when they start, (3) maintain high operating speed even under considerable overloads, and (4) have a flat efficiency curve over a wide operating range.

FOR COMPLETE INFORMATION on Wagner Repulsion-Start Induction Motors, ask for Bulletin MU-185 which describes all types of Wagner single-phase, polyphase, and direct-current motors.

THERMOBANK

by **KRAMER**



KRAMER-TRENTON CO. Trenton, N. J.

*Write for
Bulletin TV-345*

KEY TO GOOD SERVICE TODAY and GOOD BUSINESS TOMORROW



Our Factory Service Plans open the way to future appliance sales

In these days when new appliances are scarce or unobtainable, it's a big job for dealers to promptly service appliance motors. You can take care of this job if you're prepared to repair or replace inoperative motors *quickly, economically, and expertly*. And the good service that you render today will bring you customers for appliances when new appliances are again available.

G-E Factory Service Plans enable you to make repairs and replacements on practically any G-E fractional-horsepower motor, regardless of the type or make of appliance on which the motor is used. And there's no need for you to train repairmen. G.E. makes the repairs *quickly* and *at reasonable cost*—and you know your profit beforehand. You provide convenient, satisfactory service to your customers without doing the actual repair work.

Your distributor has, or can get, complete details about these simple and profitable Plans. *Ask him about them, today.* Or just fill in and mail the handy coupon.



FRACTIONAL-HP
MOTORS

Buy all the BONDS you can—
and keep all you buy

GENERAL  ELECTRIC

Here are the 3 Plans that will help you service G-E Fractional-hp motors

1. THE EXCHANGE PLAN

Covers the most commonly used types of G-E fractional-horsepower motors. Makes possible immediate replacement, from G-E field stocks or from your own buffer stock. Replacement motors carry the G-E new-motor warranty, except for finish.

2. SPECIAL REPAIR SERVICE PLAN

Provides for factory repair of semi-standard G-E fractional-hp motors not covered by the EXCHANGE PLAN, at established prices. Enables you to make quick, accurate, on-the-spot estimates. Repaired motors carry the G-E new-motor warranty, except for finish.

3. REGULAR REPAIR PLAN

Covers fractional-hp motors not included in either of the other two plans, except extremely old or obsolete models. Inspection is made at the factory, and a cost estimate is submitted before work is started. These motors also carry the G-E new-motor warranty, except for finish. This plan rounds out this G-E service and enables you to handle repairs on practically any G-E fractional-horsepower motor.

General Electric Company, Section 700-79
Schenectady 5, New York

Please send me a copy of your booklet which describes
your FACTORY SERVICE PLANS that will help me service
G-E fractional-horsepower motors.

Name.....

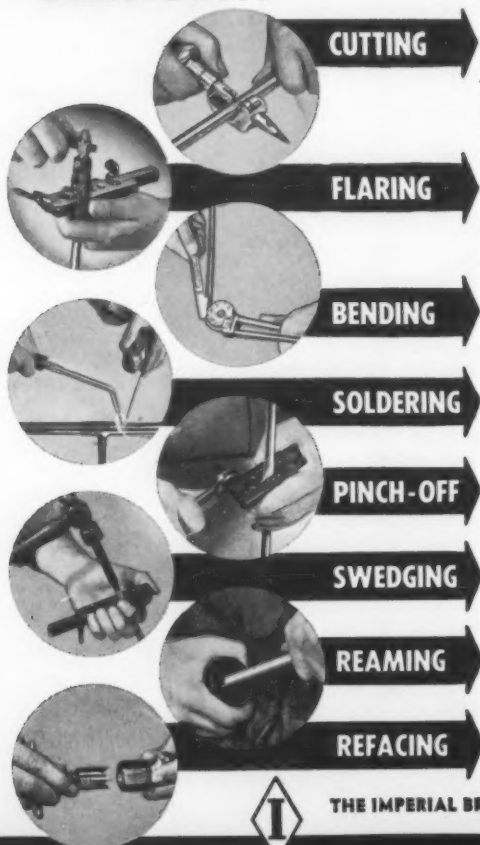
Company.....

Address.....

700-79

**Speed your
tubing connection
work with
Imperial Tools**

**USE THIS HANDY
TUBE WORKING TOOL
SELECTOR ...**



SIZE TUBING SERVICED	SPECIAL FEATURES OR DESCRIPTION	CATALOG NUMBER
$\frac{1}{8}$ " to $\frac{3}{8}$ ".....	Roller-type, with flare cut-off groove...	174-F
$\frac{3}{8}$ " to $1\frac{1}{4}$ ".....	Roller-type, with flare cut-off groove...	212-F
$\frac{1}{8}$ " to $\frac{3}{8}$ ".....	Small, pocket-size cutter.....	127-F
$\frac{1}{8}$ " to $2\frac{3}{4}$ ".....	Sawing vise.....	184-F
$1\frac{1}{4}$ " to 4 ".....	Sawing vise.....	185-F
$\frac{3}{8}$ " to $\frac{1}{2}$ ".....	Has quick slip-on yoke.....	193-F
$\frac{1}{4}$ " to $\frac{5}{8}$ ".....	Has quick slip-on yoke.....	195-F
$\frac{1}{4}$ " to $\frac{3}{8}$ ".....	Self-clamping type.....	295-FS
$\frac{3}{8}$ " to $\frac{1}{2}$ ".....	Wide range type.....	175-F
$\frac{3}{8}$ " to $\frac{1}{2}$ ".....	For smaller range of diameters.....	93-F
$\frac{1}{4}$ " to $\frac{3}{8}$ ".....	For smaller range of diameters.....	95-F
$\frac{3}{8}$ " to 1 ".....	For larger sizes.....	103-F
$\frac{3}{8}$ " to $\frac{1}{2}$ ".....	For double-flaring metal tubing.....	93-FB
$\frac{3}{8}$ " to $\frac{3}{4}$ ".....	For double-flaring plastic tubing.....	175-FP
$\frac{1}{4}$ " to $\frac{3}{8}$ ".....	Set of 6 spring-type benders.....	101-F
$\frac{3}{8}$ " to $\frac{1}{2}$ ".....	Open-side bender. Positions anywhere on tube. Individual bender for each size	364-F
$\frac{3}{8}$ " to $\frac{3}{4}$ ".....	Heavy-duty bender outfit.....	360-F
For use on all solder fitting work.	Outfit includes torch, 4 tips, soldering iron, 6 ft. hose and tank connections...	32
$\frac{1}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ ".....	Hex nut adjusters. Has holes for re- rounding tubing.....	105-F
$\frac{1}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ ", and $\frac{3}{4}$ ".....	For joining tubing without fittings. Kit includes flaring bar, 4 swedging tools, packed in steel case.....	195-S
$\frac{1}{4}$ " to $\frac{3}{4}$ ".....	Individual swedging tools—no bar.....	93-S
$\frac{1}{8}$ " to $1\frac{1}{4}$ ".....	For reaming both inside and outside edges of tubing.....	208-F
$\frac{1}{4}$ " to $\frac{3}{4}$ ".....	Tool for refacing S.A.E. flare seats which have become nicked or marred. Includes cutter, 5 adapters.....	98-F



THE IMPERIAL BRASS MFG. CO., 536 S. Racine Ave., Chicago 7, Ill.

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FITTINGS • VALVES • DEHYDRATORS
FILTERS • FLOATS • CHARGING LINES
TOOLS FOR CUTTING, FLARING, BENDING,
COILING, PINCH-OFF AND SWEDGING

THE INDUSTRY

VOLUME 2, No. 5

MAY, 1945

The Refrigeration Industry

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Copyright 1945 by REFRIG-
ERATION PUBLICATIONS,
INC., Cleveland, Ohio.
Published Monthly by RE-
FRIGERATION PUBLICA-
TIONS, INC., Cleveland, Ohio.
IRVING B. HEXTER, Pres.
LESTER P. AURBACH, V.Pr.

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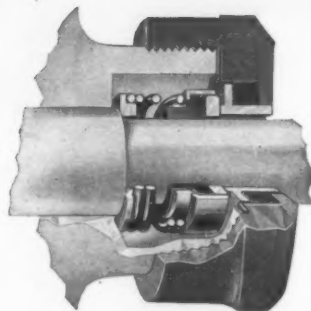
The month's engineering and equipment developments 52

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THAT ★

Rotary Seal REPLACEMENT UNITS



**Are Available for Over 752
Models of Refrigerating
Assemblies?**

752 different Models! In each case the unit is designed to fit the particular compressor listed in the manufacturer's catalog without any reworking of compressor parts themselves!

When you install a ROTARY SEAL Unit you do so with complete confidence that you are using a seal which is backed by years of experience in developing a product which is recognized as the best obtainable.

Protect your reputation—safeguard your customers—by using only ROTARY SEALS in your service work.



ROTARY SEAL COMPANY

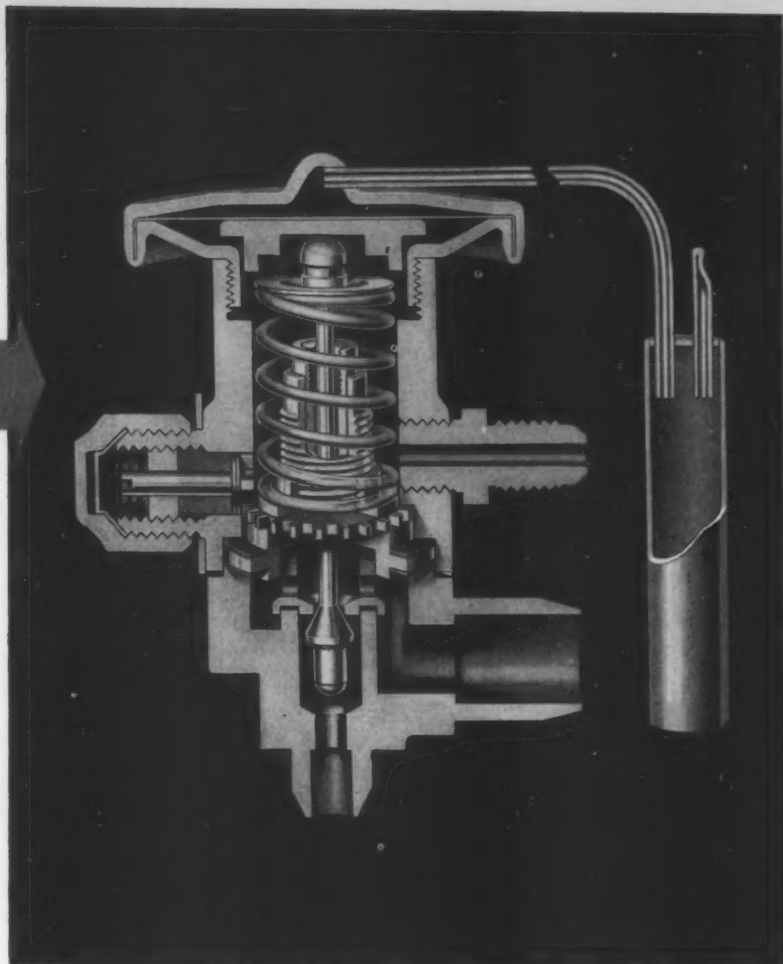
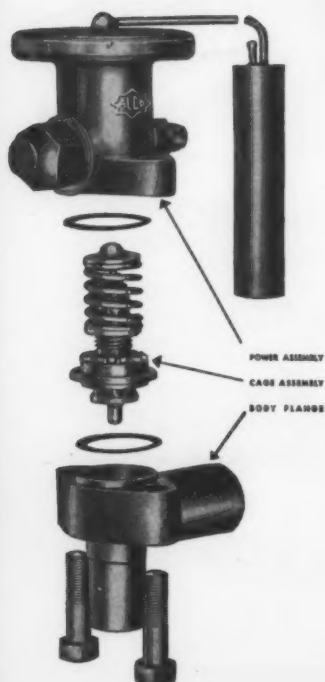
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Chicago 14, Ill.

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SEE

The Advantages
of an Alco
Thermo Valve



Here is a refrigerant flow control that is *engineered* for operating efficiency. Look at its simple construction—no multiple diaphragms or springs to cause excessive friction. Only three major units—power assembly, cage assembly and body flange. All working parts contained in easily removable cage assembly. Valve need not be taken from line for servicing. This simple, unit-type construction is your best assurance of low operating costs and greater refrigeration efficiency. See your Alco Jobber. Alco Valve Company, 843 Kingsland, St. Louis 5, Mo.



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Solenoid Valves; Float Switches; Float Valves.
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Write FOR YOUR COPY OF
THIS SERVICE HELP

This is the first of a series of service bulletins, published by Detroit Lubricator Company. They are printed on 8½" x 11" paper, punched for a standard loose leaf binder. Copies may be had on request. Write for yours.

Refrigeration System ENEMY No. 1 Is MOISTURE

A few drops of water accumulated at the expansion valve orifice may freeze it shut or open and put the whole system out of operation, just as ice in the carburetor stops your car. Also, water can interact with refrigerant and oil to form sludge or gum which may subsequently clog the valve. Moisture is Refrigeration System Enemy No. 1.

Moisture, in the form of water vapor, is ever present in the air. It will condense into liquid when in contact with any cold surface, just as water forms on the outside of a cold drinking glass. Inner surfaces of a cold refrigeration system will condense water from any air which has been allowed to enter the system. Therefore, opening a cold system to the atmosphere is inviting moisture trouble. Leaving a pound or two low side pressure when opening

But where units must be assembled in the field, thorough drying becomes a difficult problem. In subsequent insertions in this series we will discuss methods which have proved effective. There are three methods in general use—(1) heat and vacuum; (2) chemical dryers; (3) liquid dryers.

Complete elimination of moisture from a surface is extremely difficult. For example, you can't wipe a surface really dry with the dryest cloth. A surface which appears dry may have considerable moisture which clinging to it makes drying systems difficult.

Space limitations prevent giving the full text of this service help on this page. The service bulletin illustrated here is complete. Write for your copy.

How to
Due to Accumulation
of compressor
32° s



Moisture in the refrigeration system freezes up valves—halting operation—much as ice in the carburetor stops your car.

a system provides an out-keep out moisture effectively.

"DETROIT" VALVES

FOR BETTER PERFORMANCE

"Detroit" Expansion Valves and "DL" Solenoid Valves stand high in the favor of refrigeration men everywhere because they do the job better, and last longer. There is a "Detroit" Valve for every refrigeration need. Write for Catalogue No. 200-A.



No. 899 New Dura-frame Thermo-static Expansion Valves for commercial installations. Furnished with external equalizer and forged union connection.

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General Offices: DETROIT 8, MICHIGAN

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**Your Plans for Postwar Expansion and Modernization
Will Include Refrigeration and Air-Conditioning
... All Requirements Will Be Met by**

CURTIS

COMMERCIAL REFRIGERATION AND AIR-CONDITIONING UNITS

*Users attest to the dependable,
trouble-free, and economical per-
formance of Curtis Equipment.*

Just as Curtis is today planning ahead to add new units and to improve and refine many features to keep pace with postwar demand, you, too, should be seriously thinking of the postwar market for air conditioning and refrigeration equipment.

All reports definitely prove the fact that of all industries scheduled for postwar expansion, air conditioning and refrigeration are close to the top. You can get your share of this business by laying a solid foundation now, and you can count on Curtis to assist you in every way possible.

Today, all Curtis Units except packaged air-conditioners are available under proper allocation. When Victory is won, the complete Curtis line, improved, up-to-the-minute, and reflecting the experience gained over 91 years, will be ready for you. But — start planning now!



Write for Complete Information

You'll be interested in reading about the possibilities in the field of air conditioning and refrigeration. Write today for Bulletins C-64-E, C-68-C, and C-14-M, covering this interesting and profitable business.

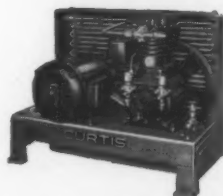
CURTIS REFRIGERATING MACHINE DIVISION

of Curtis Manufacturing Company

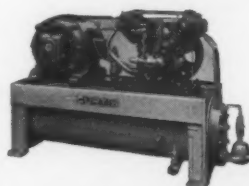
1915 Kienlen Avenue, St. Louis 20, Missouri



*5-hp. Curtis Packaged
Air-Conditioner*



*1 1/2 hp. Curtis Condensing
Unit*

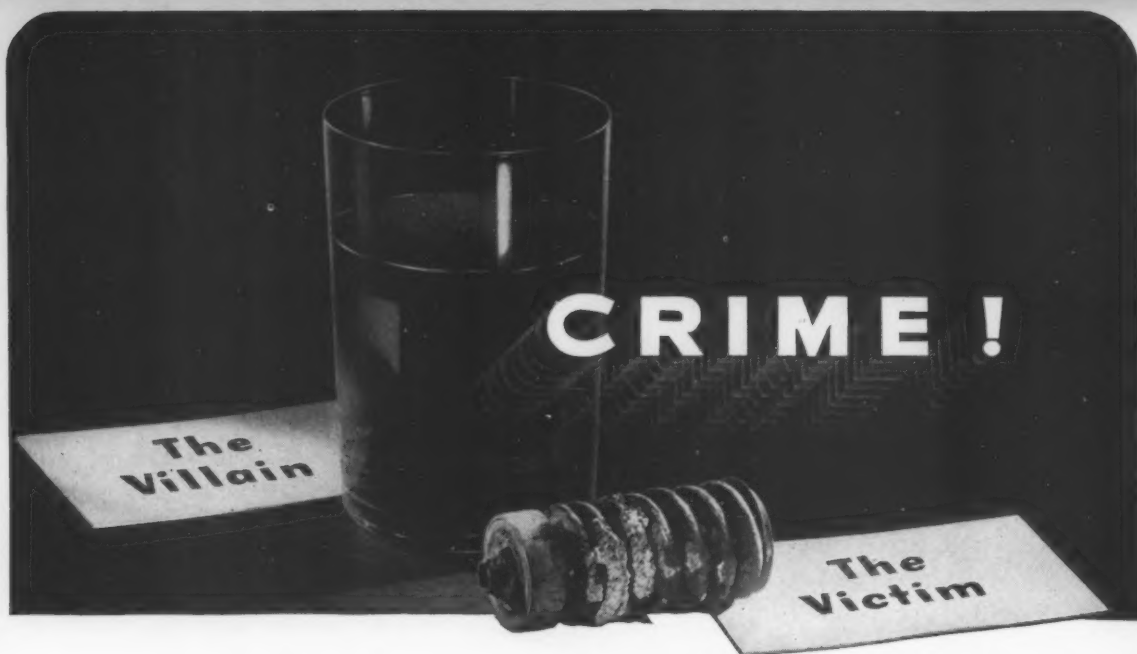


*15-hp. Water-cooled, Shell
and Tube Condensing Unit*



R-448

FOR VICTORY BUY MORE U. S. WAR BONDS AND STAMPS



● The villain of this story is *water*—with its three henchmen: rust, corrosion and sedimentation. Together, they were too much for a water valve. Above you see the rusty, corroded remains of its actuating spring—a victim of the agent it was to control—WATER!

It's a crime to permit water to thus imperil the operation of a commercial refrigerator or air conditioning system. And you don't have to—if you use PENN water valves. They're designed to combat rust, corrosion and sedimentation successfully. *Range springs and sliding parts never come in contact with water*—dependable, long-life performance is assured. With a PENN

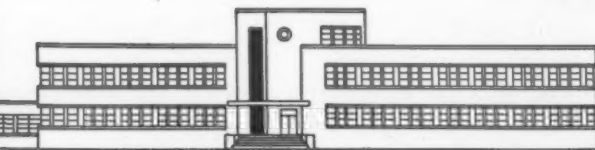
valve there are no sticking seats, no rusty range springs. It is extremely sensitive to changes in refrigerant head pressure—yet free from water hammer, too!

The PENN 246 is built in two styles—flanged and threaded—and in a wide capacity range. Get the whole story about this new-type water regulator in your free copy of Bulletin R-1986.

Write *Penn Electric Switch Co., Goshen, Ind.* Export Division; 13 E. 40th Street, New York 16, U.S.A. In Canada: Powerlite Devices, Ltd., Toronto, Ontario.

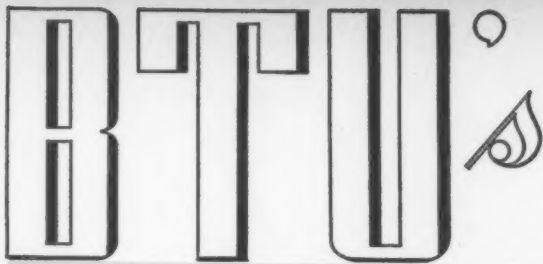


PENN



AUTOMATIC CONTROLS

FOR HEATING, REFRIGERATION, AIR CONDITIONING, ENGINES, PUMPS AND AIR COMPRESSORS



News • Laws • Trends

● P-126 RATINGS TIGHTENED

USE OF RATINGS assigned by Order P-126 to get any new condensing unit (except hermetics, for replacement only), new cabinet or other insulated enclosure, new low side units, or new systems containing any of these items is prohibited by Direction 1 to the order, issued April 14. For details, see story on page 41.

● REMA COMPRESSOR GROUP

A NEW REMA GROUP—Refrigeration Condensing Unit Manufacturers Association—within Rema 'was organized at a recent meeting in Chicago.

Seven manufacturers: Brunner Mfg. Co., Curtis Refrigerating Machine Division, Lynch Mfg. Corp., Mills Industries, Inc., Servel, Inc., Tecumseh Products Co., and Williams Oil-O-Matic Heating Corp., were represented at the organization meeting.

B. J. Scholl, of Brunner, was named chairman of the group, Sterling F. Smith, Mills, was elected vice president, and H. C. Morrison, Curtis, was named treasurer.

● HELP ON DEFERMENTS

UNSEASONABLY WARM early spring weather brought on a rush of service calls and furnished a preview of the chaotic conditions possible when summer really hits because of the way in which Selective Service has drained manpower from the refrigeration field.

National Refrigeration Service Council, however, is gaining some ground in its battle to gain for the industry the recognition it merits.

After hearing reports at a meeting in Cleveland on April 3 which indicated that unless present draft board practices are halted, the service industry will be unable to keep up with the job before it, National Director W. R. Kromer led a special committee to Washington, April 9 for meetings with government officials.

Committee members, besides Mr. Kromer, were P. B. Zimmerman, representing ACRMA; R. K. Hanson, representing Rema; H. T. McDermott, representing RSES; and George Roche, representing NRSJA.

As a result of the meeting, WPB has officially informed its field offices to assist in the deferment of refrigeration repair men, both under and over 30 years of age, in instances where the local need for such men is critical.

In the instructions, WPB field offices were advised that individual contractors requesting certification of less than seven men were to be given immediate consideration, with the balance to be sent to Washington for certification there. OCR is acting as "claimant agency" for the industry.

Individual employers, or local Councils, should seek aid from the local WPB in instances where repair men have been reclassified out of an essential status. Best results from now on, the National Council believes, can be obtained by local action.

● CANADIAN MEETING

THE MORE THAN 400 members of the industry who attended the annual conference of the Interprovincial Association of the R. S. E. S. in Montreal in mid-March were told that, in both countries, winning the war is the primary concern, and that their job for the present at least will be keeping existing equipment operating, rather than selling and installing new equipment.

C. M. Lowe, administrator of priorities for the refrigeration industry in Canada, was a speaker at the conference. Others included C. W. Stoner, Ben-Hur Mfg. Co.; Wayne Jordan, Liquid Carbonic; H. T. McDermott, national R. S. E. S. secretary; Paul B. Reed, Perfex Corp., and R. H. Lock, J. H. Lock & Sons, Toronto.

New officers of the Interprovincial association, elected at the meeting, were: W. H. Sneath, Toronto, president; Charles Pigeon, Montreal, first vice-president; A. J. Pike, St. John, N. B., second vice-president; E. G. McCracken, Toronto, secretary, and G. Condie, Toronto, treasurer.

W. J. Marshall is chairman of the board of directors. Other members are W. L. Mullinger, C. Treadwell (Nova Scotia); J. D. Ross, L. P. Tremblay (Quebec); H. R. Dickinson, C. F. Kloefer (Calgary); A. LaFlamme, G. W. Larlee (New Brunswick); O. B. Frayne, D. Fowler (Ontario); W. Podd, H. Arthur (Ottawa).

● MILK COOLERS

WPB'S REFRIGERATION Section is planning to institute a milk cooler manufacturing program some time during the latter part of the year, providing manpower and materials for such an undertaking are available. Details of the program are not announced as yet, but the program, if it goes through, will probably be in the form of a direction to L-38 similar to the one issued recently for the display case program.

● FREEZER PRICES SET

PRICE CEILINGS on four makes of home and farm freezers have recently been set by OPA. They are as follows:

American Refrigerator & Machine, Inc., Minneapolis: three-door 14.54 cu. ft. chest powered by $\frac{1}{3}$ H.P. condensing unit—consumers' price, \$670; distributors' price to dealers, \$402; manufacturer's price to distributor, \$335.

Gross Co., Milwaukee: 11.25 cu. ft. unit, $\frac{1}{3}$ H.P. condensing unit—retail price, \$390; dealers' price, \$234; distributors' price, \$195.

Jack Frost Freezer Co., Tacoma, Wash.: 22 cu. ft. unit, Continued on page 45



The Johnson service shop is compact, well-equipped.

★ They

How one big-city contractor has revamped his routing so as to handle more service calls with fewer service men

THE WAR and its attendant conditions have brought plenty of changes to Johnson Refrigeration Construction, one of Detroit's leading refrigeration contracting organizations. A good many of the changes have been the result of necessity—shortages of manpower and materials, things that all of us in the refrigeration business recognize without having to have them called up.

But at least one of the changes—and it came along during these war times, too—has been of decided advantage to the company in helping it to keep up with its all-city coverage of household and commercial maintenance calls. That's the system, instituted by the Post Office Department in large cities throughout the country, of designating postal zones, and get-

ting up zone maps of these cities, with the individual areas clearly marked off.

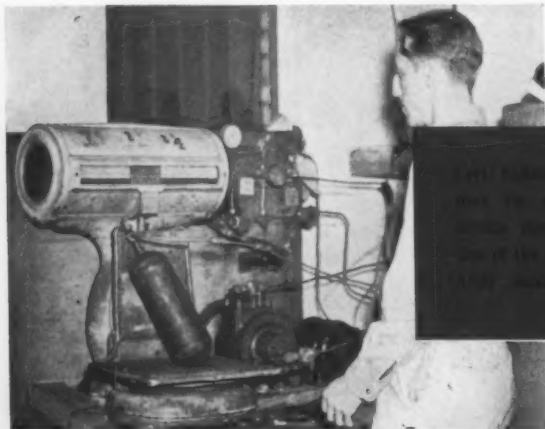
Ken Hoover, Johnson's service manager, hit on the zone system right away as a very good answer to the problem of routing service calls, especially in these days when men must often be shifted from one part of the city to another, and when new men frequently must be sent out on their own without too much knowledge of the territory they have to work.

As a result, Johnson's service men really know their way around, geographically speaking; the zone system sees to that. Ken Hoover says it's been a life-saver to the company, in helping newer men become oriented; and it's been a time-saver as well, in times when you have to make every

minute count if you're going to keep up with your calls.

Another thing the zone system has done, Ken Hoover says, is to make a lot less complicated the job of routing calls. In any big city, following the usual routing plan, the man on the dispatcher's desk has to know the town as well as any taxicab driver, or he's liable to mix things up to the point where, as far as calls are concerned, many are received but few are answered.

With the zones set out on the dispatcher's desk map, the job's a pipe. The first thing you ask, when a call comes in, is: "What zone are you in?" And you'd be surprised, Mr. Hoover says, to learn how many persons don't know the answer to that one. But, assuming that this particu-



KNOW THEIR WAY AROUND

lar caller does know, all you (as dispatcher) have to do is to note it down, together with name, street address, and other information indicating what the trouble's likely to be.

Then you ticket the call for the service man who's assigned to that particular zone, and when he calls in next time, you pass it along to him. He's got an enlarged map (we'll assume) for the zone or zones he's covering, showing all the streets, and it's no trick for him to spot the location and line it up with his other calls so that it fits into its proper place in his day's work.

With things simplified to this point, from a routing standpoint, an inexperienced person can take over the dispatcher's trick for a spell, with assurance that things will continue to be handled as they should be. This leaves the regular man free to handle some other phase of the work that may require a little more know-how.

The ease in routing calls isn't the only advantage of zoning, from the dispatcher's viewpoint, either. With each man's work blocked out for him in this way, you have an idea well in advance when calls are beginning to pile up in one section of town. Suppose, for example, that today Zone 3



calls are coming in like mad, while Zone 6, nearby, is having a comparatively light time of it. Tomorrow it'll probably be the other way around, but today's your problem now. The zone plan gives you advance warning of this condition, allowing you to switch the Zone 6 man into Zone 3 to help clean up the over-
Continued on page 38



REBUILDING THE *Coldspot* UNIT

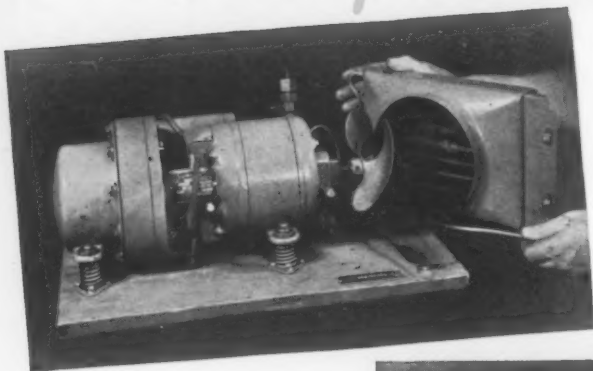


Fig. 1 (left): Moving condenser out to allow easy motor removal. Note adapter in port of receiver.

A discussion of common service complaints and shop equipment required in rebuilding operations

By Elmer H. Wiedwald

THERE is a general trend in the refrigeration service industry to avoid the Coldspot unit, either as a service or rebuilding problem. With very little special equipment, a good job can be done on either of these operations. In this and the following articles, we will touch briefly on the service angle of these units, and spend more time on rebuilding operations, the major source of revenue.

The trouble with Coldspot units which would require shop work can be summed up briefly as follows: gas leaks, stuck compressor, defective expansion valve. In general, gas and oil leaks occur most frequently at the following points: suction line at the entrance to the compressor, seal leak, and the soft solder joint just at the outlet of the automatic expansion valve. Each point will be covered more extensively in the shop procedure suggestions which follow.

Certain shop equipment is a requisite to overhauling Coldspot units. The first item, which is used in all good shops, is a small oven. If none is available, one can be built very reasonably. Pick up an old Majestic, G-E monitor top cabinet, or similar machine, of 6 or 8 cubic feet capacity,

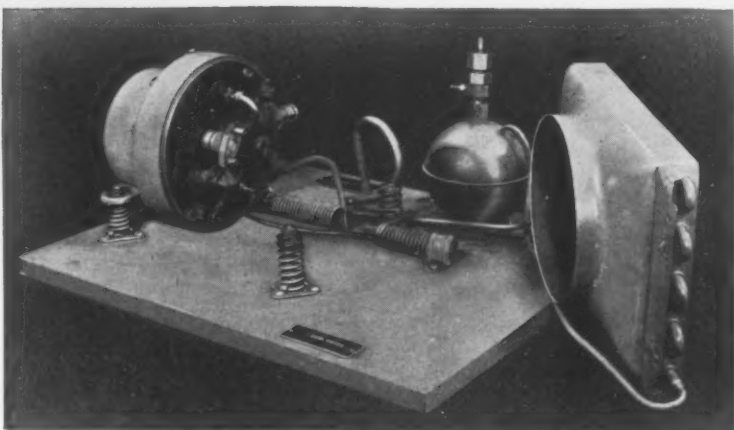


Fig. 2 (below): View of Coldspot unit with motor removed. Compressor is now ready to be taken out.

and remove the unit. Heating units can be obtained from an old electric range, and several supply houses have range thermostats for sale without priority that are calibrated, and can be used very advantageously.

Close up the top of the cabinet with a piece of 18 or 20 gauge sheet steel fastened securely with Parker Kalon screws. Put about 4 inches of rock wool insulation over this, and then cover the entire assembly with another sheet. This type of converted oven can carry 250° F., and will retain the heat for several hours after the oven is shut off. For practical purposes, the oven can be carried between 200 and 220° F.

For vacuum, most any rotary pump will pump to 29 inches or better. If one is available, the compressor and motor assembly used in the G-E unit, Model CA, charged with methyl formate will provide an excellent vacuum pump. This machine will pull

down to at least 50 to 100 microns. A manifold can be built on the oven to provide means of shutting off the vacuum and breaking with dry nitrogen or Freon. For Coldspot work, a 29 inch vacuum at 210° F. for at least eight hours is recommended.

You will also need a hermetic test set for charging and discharging. This can be obtained at most supply houses. The rest of the equipment is nearly standard with all good shops. This includes a drill press, small 9-

inch lathe, welding torch, and air supply for blowing off the parts after cleansing.

Install the proper adapter from the hermetic set, and thread it in the port on top of the receiver. For ease in working, allow the unit to discharge until the receiver is at room temperature. While the unit is discharging, the receiver will frost until all the SO² is gone. After this is done, remove the screws holding down the condenser and baffle, and remove baffle completely.

Move the condenser out far enough so that the motor can be removed easily, taking out the four cap screws holding the compressor and motor together and the four mounting nuts on the springs. Dismantle the terminal box cover and remove the wiring from the motor. Write down the wiring diagram if you are not familiar with the Coldspot unit.

Continued on page 46

FROM THE JOBBER'S EXPERIENCE



**GEORGE J. ROCHE, President
PARKS AND HULL APPLIANCE CORP., says-**

"Our customers DEMAND DAVISON'S Silica Gel"

"They say that Davison's Silica Gel was the first practical drying agent that gave them the capacity necessary to completely eliminate moisture troubles. Experience with Davison's showed them its other advantages—and many of them say it actually helps them do a better job for their customers. I've heard many interesting stories of how Davison's Silica Gel has 'saved the day' on a particularly mean job. Sure—they all try other drying agents, but they come back to Davison's Silica Gel pretty quickly because when they use Davison's they can be sure."

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This business of engineering efficiency follows a definite logical pattern. Get a pencil and figure it out for yourself.

It's not as tough

By George H. Clark

LAST month our hero, Little Elmer Sadsack, of Omigosh, Kan., was in a daze for days after tangling with the problem of how much horsepower will push how many B.T.U. how many degrees uphill how fast.

But, being inquisitive as well as skeptical, he brought forth pencil and paper and drew pictures, put down figures and otherwise pondered over the mysteries of the relationships existing between compressor displacement, volumetric efficiency, mechanical efficiency and horsepower.

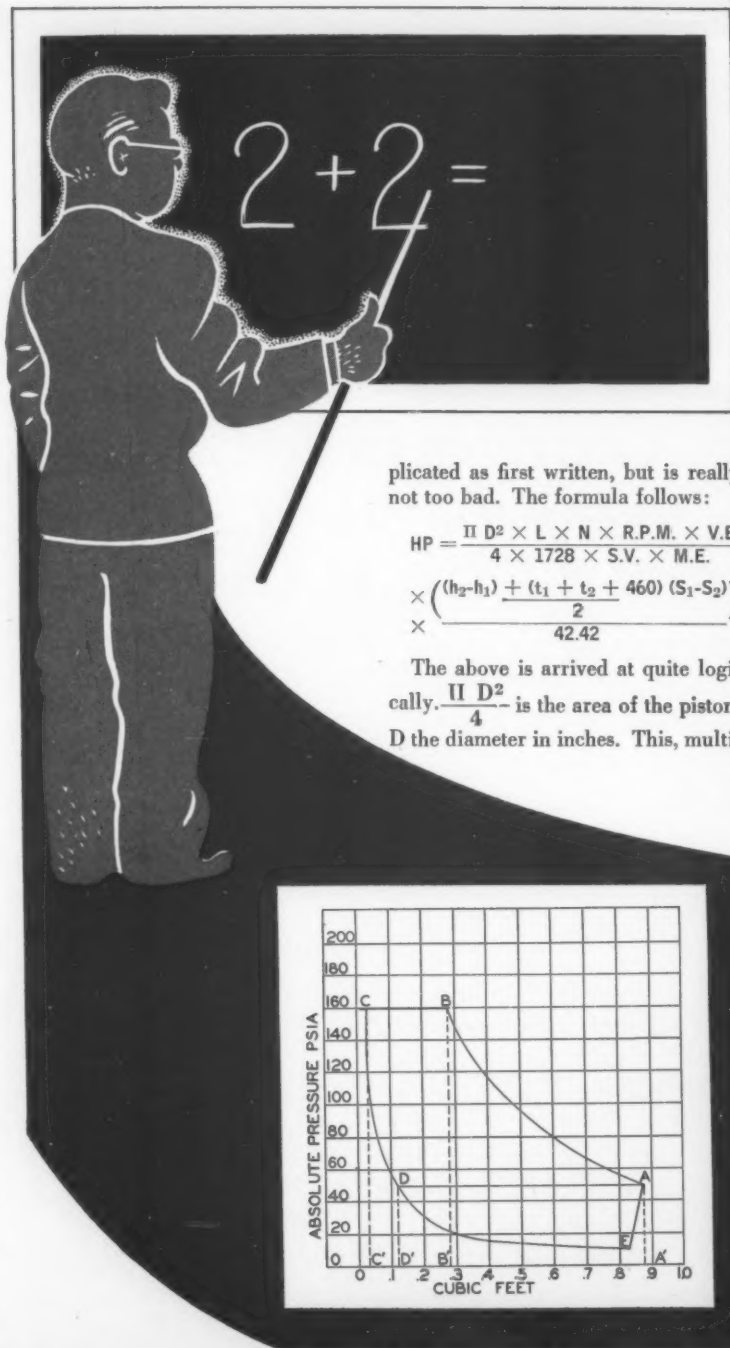
Well, says Elmer, if I find the area of the piston, the length of the stroke, the compressor speed, etc., I should be able to find the displacement of the compressor. Quite true, but the volumetric efficiency must be taken into account before you can tell what volume of gas can be pumped, and for your convenience the following formula will tell you how much gas the compressor will handle. The quantity of gas is of course based on the volume of the gas at the inlet pressure.

$$\text{(Gas pumped) C.F.M.} = \frac{\pi D^2 \times L \times N \times \text{R.P.M.} \times \text{V.E.}}{4 \times 1728}$$

C.F.M. = cubic feet per minute.
D = piston diameter in inches.
L = length of strokes in inches.
N = number of cylinders.
R.P.M. = revolutions per minute.
V.E. = volumetric efficiency expressed decimally.

But now that we have the actual capacity of the compressor, how much power will it take to drive it? Last month, horsepower calculations were made, based on the number of pounds of refrigerant per minute the compressor circulated, and also on the quantity of refrigeration produced.

This can also be developed further to determine what horsepower is required to drive a given compressor under a definite set of conditions. A formula to do this looks a little com-



as it looks...

plied by the length of stroke (L), gives the displacement of one cylinder for one compression stroke. Multiplied by the number of cylinders (N), we get the displacement of all cylinders for one revolution of the shaft, and multiplied by R.P.M. we get the displacement in terms of cubic inches per minute.

Cubic inches per minute divided by 1728 cubic inches per cubic foot gives cubic feet per minute of displacement. Cubic feet per minute times volumetric efficiency gives the cubic feet of gas actually pumped per minute, and this divided by the specific volume (S.V.) of the gas at inlet conditions gives pounds of refrigerant pumped per minute.

The increase in heat content of one pound of refrigerant during compression is found from $h_2 - h_1$ where h_2 is the heat content after compression and h_1 is the heat content before compression. In addition, each pound of refrigerant gives up a certain amount of heat during compression by means of air-cooled fins or a water jacket. This quantity of heat is found from $\frac{(t_1 + t_2 + 460)}{2} (S_1 - S_2)$ or multiplying the average absolute temperature by the change in entropy. The increase in heat content during compression plus the heat given up

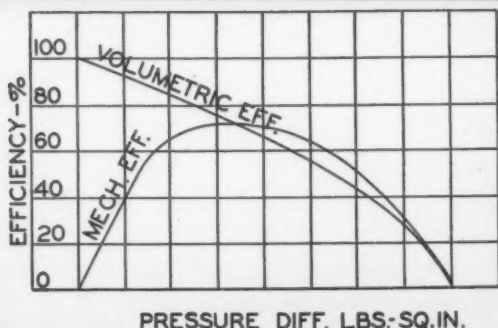
during compression must represent heat which results from foot pounds of energy supplied to the refrigerant by the compressor.

Multiplying pounds of refrigerant per minute by B.T.U. per pound of refrigerant resulting from compression gives B.T.U. per minute. 42.42 B.T.U. per minute is the equivalent of one horsepower, or the heat that would be dissipated through the use of one horsepower in overcoming friction for one minute.

Consequently, if we divide B.T.U. per minute by 42.42 B.T.U. per horsepower minute, we get horsepower. However, this horsepower is that which is actually delivered to the gas. If, in general, we say the mechanical efficiency (M.E.) is 65%, we mean that if the output or power delivered to the gas is a definite amount, the input horsepower will be that amount divided by the efficiency. So—Little Elmer, there you are.

To go over this once more and lightly, let's take an example. Suppose we pick a compressor as follows:

Bore: 4 inches.
Stroke: 5 inches.
No. of cylinders: 3.
Speed: 500 R.P.M.
Suction pressure: 50 p.s.i.a.
Discharge pressure: 160 p.s.i.a.
Inlet temperature: 60°F.
Outlet temperature: 140°F.
Volumetric efficiency: 85%.



Mechanical efficiency: 68%.
Refrigerant: "F-12".

The first thing to do is find a table giving the properties of superheated F-12 at pressures of 50 p.s.i.a. and 160 p.s.i.a., from which we find the following properties:

Inlet
Pressure: 50 p.s.i.a.
Temperature: 60°F. (t_1)
V (S.V.): .863 cu. ft./lb.
h (h_1): 85.72 B.T.U./lb.
S (S_1): .17475

Outlet
Pressure: 160 p.s.i.a.
Temperature: 140°F. (t_2)
V.: .282
h (h_2): 94.12
S (S_2): .17269

Now we go back and plug the holes in our formula as follows:

$$\text{H.P.} = \frac{\pi .16 \times 5 \times 3 \times 500 \times .85}{4 \times 1728 \times .863 \times .68} \times \frac{(94.12 - 85.72) + \frac{(60 + 140)}{2} (.17475 - .17269)}{42.42}$$

Then we limber up our slide rule, or borrow our jobber's computing machine, and simplify to:

$$79.0 \times \left(\frac{8.40 + 1.15}{42.42} \right) = \frac{79.0 \times 9.55}{42.42} = 17.8 \text{ H.P.}$$

While Little Elmer is digesting this one, let's go off in a corner and see what sort of things mechanical efficiency is made of. Theoretically, if a compressor was discharging at the same pressure at which it was drawing in gas, it wouldn't be doing any work on the gas, even though the quantity of gas circulating through it was equal to the actual displacement of the compressor. In this case, then, the volumetric efficiency would be 100%, but the mechanical efficiency of the compressor would be 0%, because the mechanical efficiency is the ratio of the work done on the gas, to the work done on the compressor. We know that work has to be done on the compressor, because once started it

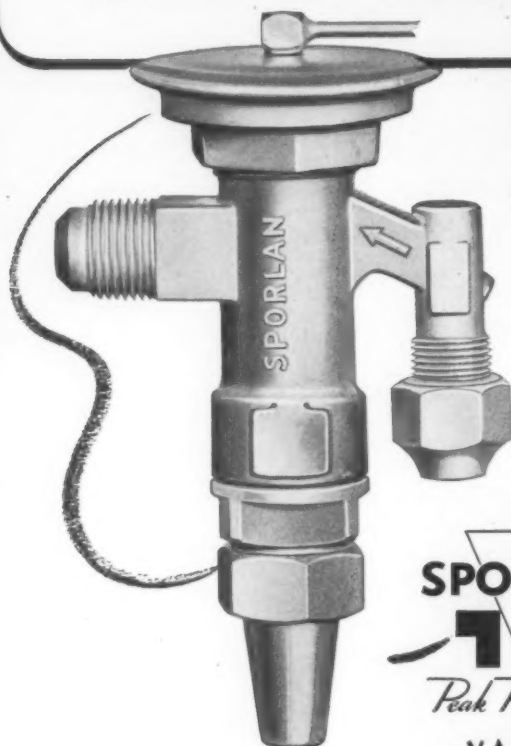
Continued on page 35

5 GOOD REASONS WHY You Should Always Specify **SPORLAN VALVES**

With Selective Charges "C" and "Z"

on All Small
Commercial Refrigeration Applications!

CZ



and Remember...

only **SPORLAN** can give you
this **PEAK PERFORMANCE**

because

- 1** Sporlan selective charges C and Z prevent flooding the evaporator at the start of the cycle.
- 2** Sporlan selective charges C and Z prevent overloading the motor at the start of the cycle.
- 3** Sporlan selective charges C and Z minimize hunting during the running cycle.
- 4** Sporlan selective charges C and Z close the valve quickly and positively when the compressor stops.
- 5** With Sporlan selective charges C and Z the control is always in the bulb, no matter how cold the valve diaphragm becomes.



How to Determine Which of the Two Charges to Use is Simplicity Itself

Just remember that the Sporlan C charge is always used on all jobs with suction temperatures ABOVE ZERO. The Sporlan Z charge is always used on all jobs with suction temperatures BELOW ZERO.

SPORLAN C CHARGE

For All Small Commercial Refrigeration Applications With Suction Temperatures **ABOVE ZERO**

DISPLAY CASES WALK-IN COOLERS
REACH-IN BOXES WATER COOLERS
BEVERAGE COOLERS FLORIST BOXES

SPORLAN Z CHARGE

For All Small Commercial Refrigeration Applications With Suction Temperatures **BELOW ZERO**

ICE CREAM CABINETS
FARM FREEZERS HOME FREEZERS
LOCKER PLANTS

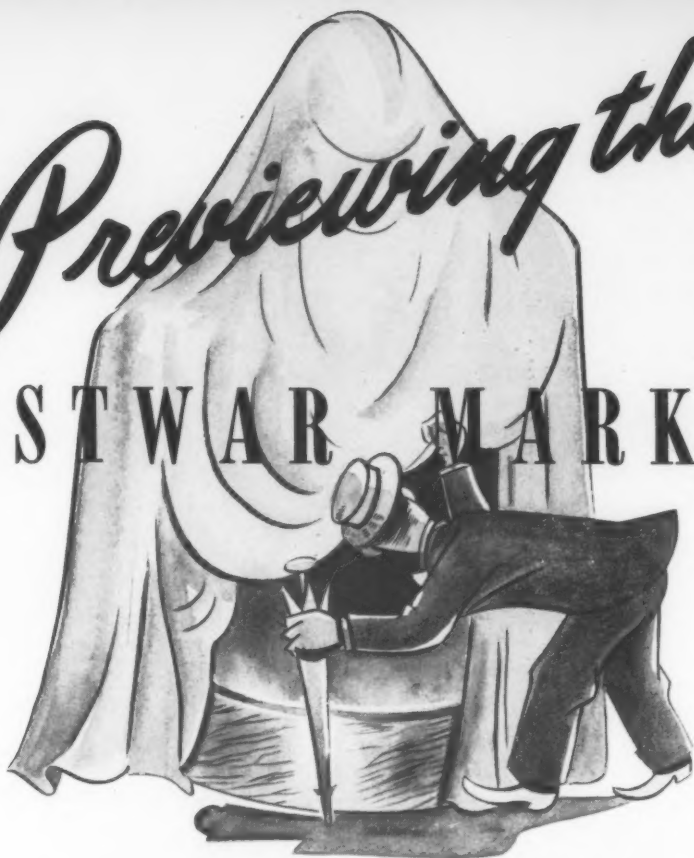
Other Sporlan Selective Charges are the Type G for all Comfort Cooling Installations and the Type X for all applications below -30° F.

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Previewing the POSTWAR MARKET



By **RICHARD S. DAWSON**

Alco Valve Co.

AN analysis and tabulation of the recent reports by the several Task Committees appointed by the Refrigeration and Air Conditioning Section of the War Production Board should serve to give us some idea of the post-war market for self-contained refrigeration and air conditioning packaged units.

Because the Task Committees' reports covered the bulk of the entire refrigeration and air conditioning market, it is probably desirable to state what equipment they did not cover.

Their figures did not include any of the following: domestic refrigerators, cold storage plants, food processing installations, industrial jobs (factories, breweries, bottling plants, etc.); transportation field (trains, trucks, busses, ships), and custom-built air conditioning installations.

Editor's Note: Mr. Dawson's analysis of the WPB Task Committee reports was originally prepared for presentation to members of Refrigeration Equipment Manufacturers' Association at a recent meeting. In the belief that the comparative tabulations are of interest to the industry at large, we present them here.

The Task Committee reports were submitted individually; to our knowledge, this is the first over-all analysis of them to be prepared.

Figures for domestic refrigerators are generally available from industry publications and for those who have access to industry statistics; also Department of Commerce figures on domestic refrigerators, generally accepted as accurate, are available.

The potentials for food process-

ing and cold storage are well indicated in the report submitted to the General Industrial Equipment Division of WPB by the Task Committee appointed to determine refrigeration equipment requirements for the food industry (report dated Nov. 26, 1943). Figures analyzed and tabulated here were prepared by Task Committees under the following titles:—

- Room Coolers.
- Frozen Food Locker Plant Study.
- Refrigerated Display Cases, Reach-In Refrigerators, Walk-In Coolers (one report).
- Bulk Beverage Dispensing Equipment.
- Farm Freezers.
- Home Freezers.
- Drinking Water Coolers.
- Ice Cream Cabinets.
- Refrigerated Soda Fountain Equipment.
- Commercial Frozen Food Storage and Dispensing Cabinets.

Bottled Beverage Coolers and Vending Machines.

In tabulating them, it was necessary to take some liberties with their figures and reduce them to a common denominator. Further liberties were taken in projecting some figures, such as estimated life of equipment, omitted from some of the reports, which it was felt would be of value.

Selected Statistics

No attempt is made to present all the statistics contained in the reports, but only those it was felt were most significant and which would be the best guides to projected post-war potentials. These values include the number of machines in use, the estimated life or average age of equipment in use, and replacements necessary now (this particular set of figures was presented for WPB consideration in allocating materials.)

The Refrigerated Soda Fountain Task Committee had another set of figures which they included and which seemed to the writer to have particular significance—"The annual production required for the next three years to supply the normal demand and pick up three years' backlog." I venture to stick my neck out and predict figures under this heading for the other classes of unitary equipment which did not include such estimates in their report.

Production Estimated

It was felt that this could be done with a reasonable amount of accuracy, because most committees' reports gave the number of units in use, and the market trends on newer types of equipment were pretty obvious in 1941. For example, it was obvious that coin-operated vending machines and home freezers had barely scratched the market.

Further liberties with the committees' figures were taken in projecting an average wholesale selling price on each class of units. An attempt was made to be conservative in fixing these prices, and a 33 1/3% mark-up was used to establish a retail value.

It was assumed that a complete condensing unit would be supplied with only a certain percentage of the units,

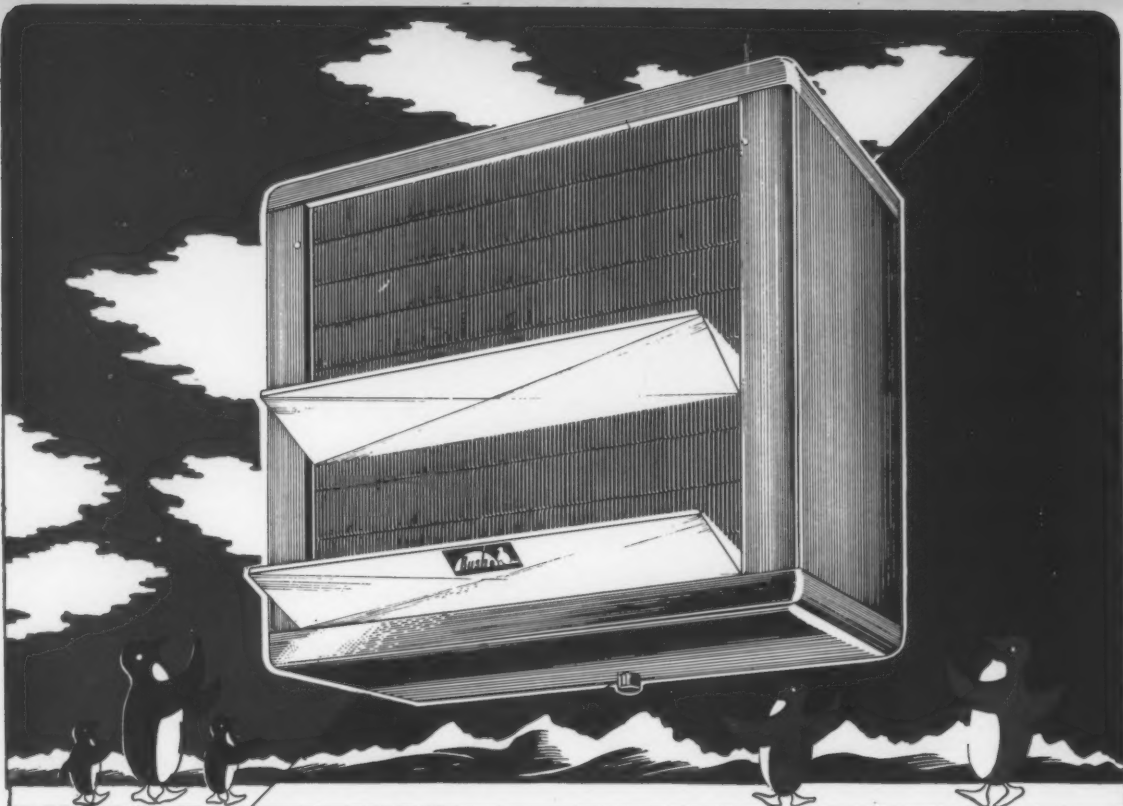
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TABLE No. 1

	Number of Units In Use	Average Life	Replacements Needed Now	Annual Prod. Reqd. for First Three Post-War Years to Meet Needs & Pick Up Backlog
Refrigerated Soda Fountain Equipment				
Cooler Boxes—Large Fountains & Cabinets	85,000	10 Years	8,500	16,500
Fountainettes and Bobtail Units	35,000	(46% Now Over 10 Years Old)	3,500	9,883
Salad—Sandwich Units	35,000		3,500	9,883
Refrigerated Back-Bars	15,000		1,500	2,983
	170,000		17,000	39,249
Bulk Beverage Dispensing Units				
Coin Operated Soft Drink Units	5,000	5 Years	2,000	5,000
Manually Operated Soft Drink Units	75,000	6 Years	20,000	15,000
Beer Coolers and Dispensers ..	281,600	8 Years	19,700	70,400
Beer Under-Bar Pre-Coolers ..	70,000	(51% Over 8 Years Old)	11,900	17,500
Beer Cabinet-Type Coolers ...	50,000		8,500	12,500
Beer Walk-In Coolers	50,000		8,500	12,500
	531,600		70,600	* 132,900
Ice Cream Cabinets				
In Retail Stores	440,000	Below 10 Years		
In Retail Stores (for Food Storage)	60,000	1/2 Over-Age) 2/3 Over 5) Yrs. Old)		
Domestic Use	100,000		60,000	* 125,000
Bottled Beverage Coolers & Vending Machines ...				
	600,000	10 Years	60,000	* 150,000
Water Coolers (Electric Only)				
	500,000	10 Years (30% Over-Age)	45,000	95,000
Display Cases, Reach-In Boxes, Walk-In Coolers				
Display Cases	433,000	10 Years	52,000	108,000
Reach-In Boxes	491,400	10 Years	25,000	123,000
Walk-In Coolers	161,200	10 Years	8,500	40,000
	1,085,600		85,500	* 271,000
Commercial Frozen Food Storage and Dispensing Cabinets				
	38,000	10 Years	17,000	* 75,000
Farm Freezers				
	5,000— 7,000	10 Years	500	30,000
Home Freezer Cabinets ...				
	100,000	?	?	500,000
Locker Plants				
	5,500	?	?	1,500
Room Coolers				
Less Than 2 H.P.	150,000	5 Years	50,000	100,000
Over 2 H.P.	30,000	10 Years	12,500	23,000
Total				1,543,000

*Writer's estimate based on 25% of installed equipment per year, which is near figures used by Task Committees who supplied these values for comparable equipment.

*OWriter's estimate—assumes selling 75% of present 300,000 retail food stores in three years.



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Bush Standard Unit Coolers have established an enviable reputation for dependability and low cost operation. New streamlined models feature casings of non-corrosive steel, finished in crackled gray, with rounded corners. There is a size for every purpose — 250 to 1800 BTU

capacity. Low speed motors and kidney type fan blades assure minimum wear and noise. A well built, sturdy product unexcelled for efficient operation. Write for new Bush Catalog which illustrates and describes the Bush Standard Unit Cooler . . . and other Bush Heat Transfer Products. For advanced engineering . . . buy BUSH.



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"Let's share our knowledge—exchange our experiences"

Here's how

Expansion Fits of Metal Parts

A comparatively recent development is the use of low temperature to secure expansion fits instead of shrink fits. This new technic reverses the operation by chilling the inside part, sliding it into the outside part and allowing it to expand into place on reaching room temperature.

The advantage of this over shrink fitting is that it eliminates the hazard of oxidizing and the necessity of final or finishing machine work. The temperatures used in this type of work vary from minus 50F to minus 100F.

Parts may be chilled by air in a cabinet at low temperature or by immersing the part in a cold antifreeze solution such as alcohol or varsol. The cooling may be accomplished by dry ice or mechanical refrigeration.

Edited by
Warren W. Farr

I always try to sell my customers on commercial installations on the purchase of an additional liquid line shut-off valve, to be installed behind the drier.

In this way, tank valve can be shut off, additional valve shut off, and drier and strainer can be changed in a very short time without undue pumping of the whole system. Purging is also simple.

Ervin Meyers, Manitowoc, Wis.

Why Borax?

In the article in our December column, "Milk Cooler Care," it was recommended that, after draining and cleaning the tank, a borax solution should be added to the fresh water upon refilling the tank. C. A. McDade, of Pittsburgh, has inquired as to why borax was suggested, noting also that some cabinets in his experience have had liners in good condition after ten years' use, while others rusted out completely in two or three years.

In our research as a result of Mr. McDade's comments, we developed some additional information, which we are offering here in the belief that it may be of general interest to men servicing milk coolers.

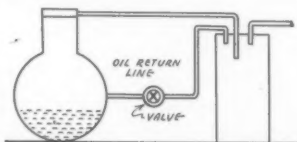
Borax, as a chemical, is a scouring and cleaning agent, an antiseptic and preservative, and a corrosion inhibitor and fungicide. It goes a long way in protecting the metal parts against milk acids which are formed when milk is washed from the outer surface of milk cans, or accidentally spilled by the farmer into the sweet water bath. It also protects against other active chemicals which may be picked up from the ground or barn floor, and which may be introduced

into the water bath when the cans are inserted.

As to the quantity necessary for milk coolers, it is difficult to recommend a definite amount, because all manufacturers do not have the same number of gallons of water in their coolers, even though the can capacity is the same. However, to the best of our knowledge, no great risk is entailed in adding a slight excess of borax to the water.

There are a number of reasons why the liners on some cabinets last for ten years, while others rust out in only two or three years. One could be the quality of the galvanizer, and another could be the type of care the cabinet receives in operation.

IN mounting an oil separator on any high-side unit, we always install a valve in the return oil line between the oil separator and compressor crankcase.



This is used for the purpose of detecting leaking discharge plates; also, it is necessary to close the valve to get a good pump down test on your compressor. With this valve eliminated, a pump down test or leaking discharge plate or leaking oil separator needle would be almost impossible to find.

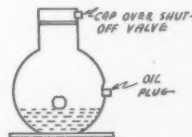
By closing the valve, a leaking discharge plate can be determined immediately. With the valve open, it may be the needle seat in oil separator leaking. The danger of this valve, is leaving it closed by mistake.

A good idea is to have the service man remove the valve handle after opening same, before leaving the job. This will keep anyone from shutting off the valve, which would in turn cause considerable damage to the compressor.

George J. Schuld, Cleveland, Ohio

IN servicing all Frigidaire compressors with the twin belt drive and high-side float, it is good insurance to check the oil level. Remember, some oil is in the dished-out base. A shortage of oil in these units will often times result in these complaints:

1. Belts not lasting.
2. Long running.
3. Motors going bad.
4. Overload in switch tripping.
5. Noise and vibration.



I always check these jobs when I suspect possible shortage of oil, as it is very simple and quickly done. Just remove cap over S. O. valve, close valve (be sure machine has been in operation to clear crankcase of liquid) and balance pressure on crankcase. Disconnect either at switch or plug. Remove $\frac{1}{8}$ plug in crankcase. Use an extra long Allen key or dark-colored rod. A bright rod will not show up the oil level.

(P.S. I dropped one in once, so have it long enough, or put a hook on it.)

Joe Gerson, Jackson, Tenn.

THE SERVICE MAN'S DEPARTMENT

Unit Air Conditioner Servicing

The following helpful suggestions on servicing of self-contained unit air conditioners were sent to this department by Nevin W. Day, of Chester, Pa. With the active cooling season not far off, we present them here, since they cover some of the most common maintenance problems on this type of equipment. These include:

1. Fusible plug blows out of the top of the receiver.

Make sure the window has not slipped down on the louvers, or the outside louvers of the duct become closed or partly closed. This causes excessive head pressure because the heat of compression cannot escape, being held in the machine compartment, causing the high head pressure and the blowing out of the fusible plug.

2. High head pressure and low suction pressure.

High head pressure is caused by air in the system, which can and should be purged at the top of the receiver. Low suction pressure may be caused by a plugged strainer at the inlet of the expansion valve or by a defective valve which is in the closed position. If the valve is defective, or if valve inlet strainer is plugged, or defective, replace it.

These units have no shut-off valve in the receiver, which means the gas cannot be pumped back and held in the receiver. A line should be attached to the discharge gauge plug connection, and connected to an empty dry tube. Start compressor and pump the gas into tube. This is very important at this time due to the shortage of "Freon-12" gas. If this is not done all of the gas will be lost.

3. Thermostatic expansion valve stays in the open position and will not close.

This is due to shortage of refrigerant, defective valve, or most often to the feeler bulb of the expansion valve not being covered. If the unit is short of refrigerant, add some. If valve is defective, replace. If bulb is not covered, cover with sponge rubber, rubber tape or any similar insulation.

4. Motor trouble.

Make sure the motor is checked every month during the operating season, as most of these units have no thermostatic control and may run excessively due to manual control. Cases have even been reported where

TEST STARTER FOR HERMETIC HOUSEHOLD UNITS

Editor, "Here's How":

Enclosed is a picture drawing of a test starter I made for hermetic household units. Manufacturers used to sell test cord sets consisting of cords, push button, test clips, etc., which in my opinion were clumsy and couldn't stand hard use or wear.

Mine can be made for not over \$1.00 by any service man who can read a simple wiring diagram, and has the immense advantage of overload protection.

The drawing explains itself—the set, of course, takes the place of relay, and throwing the tumbler switch to off simply cuts out the starting winding the way a relay automatically does, or like releasing the push-button used to on the factory outfits.

There are other uses for the set, also. By leaving the switch off, a good test set results, as current flows through red and black, thus enabling the service man to test washer motors, refrigerator motors, etc. for bad power cords or cold controls. By substituting a light bulb for the fuse, other tests can be made for grounds, shorts, opens, etc. It is really a very useful outfit.

My set is equipped with a Cutler-Hammer motor protector instead of a fuse . . . mine being a *de luxe* model! I have given my original model, the one shown in the sketch, to my friend and colleague, Foster Jones, president of Jones Bros., who are the oldest service agency in Memphis, and probably the best known in west Tennessee.

they were not turned off at the end of the working day and machines were running 24 hours per day.

5. Filters.

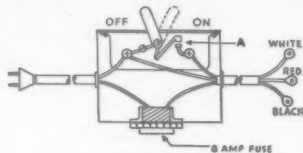
Keep the air filters clean, and replace regularly with new ones, as most of these filters are of the inexpensive throw-away type.

Head pressures should not be above 150 p.s.i., and suction pressures should be between 37 to 40 p.s.i. This means a temperature of 40 to 44° F. A temperature difference of 18 to 20° F. will prevail. This will give you an air temperature of 60 to 62° F. at the air outlet to the room, giving satisfactory results.

The outside air inlet should be regulated to suit the occupants of the room. Best results are obtained hav-

HOW TO MAKE IT

- One ordinary switch box of the kind used in house wiring.
- One tumbler switch.
- One flush plate.
- One appliance cord.
- One porcelain socket.
- One 8 or 10 amp. fuse.
- Foot length of three-wire cable.



HOW TO USE IT

"A" makes contact when "on." With tumbler switch in "on" position, current will flow to all three leads, Black to COMMON, Red to RUNNING, and White to STARTING. When unit starts, tumbler switch is thrown to "off," thus leaving the running winding lead and the common lead connected. Motor protection is provided at all times through the fuse in series in the Black lead.

The advantage of overload protection was very clearly brought out to me recently when I was on a call on the second floor of a duplex dwelling with the fuse boxes on the back porch (locked) of the lower apartment.

Had it not been for my test set overload protector, which tripped, the fuses would have blown and I would have had to break into the porch below . . . or leave my customer without lights over the week-end, as the people in the apartment downstairs were out of town.

John O. Davidson, Memphis.

ing the outside louver about one-third open.

Mr. Day points out that in the majority of package cooling units every available inch of space has been utilized, complicating the maintenance problem for the service engineer. From a servicing standpoint, he says, it might be desirable on units produced in the future to incorporate such aids to easier servicing as:

A liquid shut-off valve placed in the receiver.

A drier-filter placed in the liquid line.

Doors that can be opened in the panel of the unit, so that important parts can be serviced and gauges easily installed for testing.

Only Henry makes a Diaphragm Packless Valve that is **NON-DIRECTIONAL**

● Experience has taught the refrigeration industry that in a Henry Product it can always reasonably expect some extra value and a better feature of design and construction. The Henry Packless Valve is an outstanding example.

By means of a patented balancing channel in the lower valve stem, explained in detail below, the Henry Diaphragm Packless Valve cannot stick shut regardless of the pressure differential above or below the valve seat. When using a conventional valve, there is always the possibility that a valve installed in reversed position could fail to open if sufficiently high pressures should develop above the seat. The Henry Diaphragm Packless Valve, however, can be relied upon to give posi-

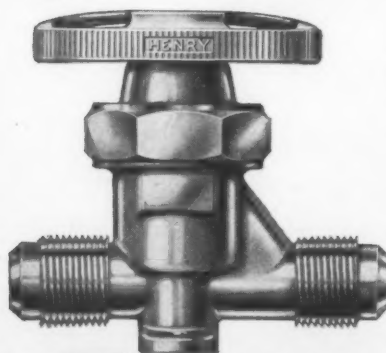
tive performance under all conditions of service because it is truly non-directional.

You will also like the Henry feature of having inlet and outlet ports in line on two way and three way valves. This eliminates tube bending and results in neater lines and lower installation costs.

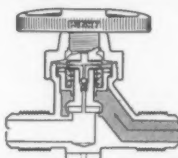
During the war Henry Diaphragm Packless Valves have been widely favored by all branches of the armed services. It is only natural that, as our country gradually turns to the problems of Peace, this Henry Product again will be the logical choice of manufacturers, jobbers, contractors and service organizations everywhere.

The Difference Between a Henry Non-Directional Balanced-Action Diaphragm Packless Valve and a Conventional Packless Valve

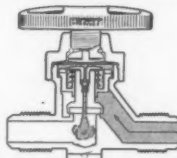
Available in a complete range of sizes with flare or solder connections.



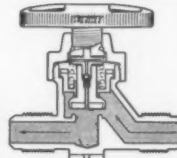
SOLD BY JOBBERS



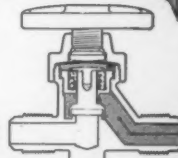
BALANCED-ACTION VALVE IN CLOSED POSITION—High pressure above the seat, low pressure below the seat. High pressure regions are shown in color. Pressure in spring cage below diaphragms is the same as that in main passage of valve body above the seat. This is due to seepage between the lower stem and the guide. Downward pressure of the bearing plate on the diaphragms seals the upper port of the balancing channel.



OPENING THE BALANCED-ACTION VALVE—As hand wheel is turned to open valve the diaphragms, because of pressure beneath them and their own snap action, rise and expose the upper port of the balancing channel. The high pressure, shown in color, unseats ball check and is instantly released through the open channel to the low pressure region below the valve seat, thus achieving "balanced-action" by equalizing pressures.



BALANCED-ACTION VALVE IN FULL OPEN POSITION—Equalization of pressures above and below the seat, as shown in color, guarantees that this valve can never "stick shut" but will always open positively, regardless of original differential in pressures. When there is high pressure below the seat and low pressure above, the balanced valve opens easier than other types because of the light weight spring.



CONVENTIONAL TYPE WITHOUT BALANCED-ACTION—As hand wheel is turned to open valve the diaphragms rise. When the differential between high pressure, shown in color, above seat and low pressure below seat is greater than force exerted by heavy spring, stem "sticks shut"—valve remaining closed. The heavy spring required in this type of valve greatly increases diaphragm wear and strain and causes stiff closing.

HENRY VALVE COMPANY



3260 WEST GRAND AVENUE, CHICAGO 51, ILLINOIS

EXPORT DEPARTMENT, 13 E. 40TH ST., NEW YORK 16, N.Y. CABLE: ARLAB

PACKLESS AND PACKED VALVES • STRAINERS • DRYERS FOR REFRIGERATION AND AIR CONDITIONING
AMMONIA VALVES • FORGED STEEL VALVES AND FITTINGS FOR OIL, STEAM AND OTHER FLUIDS



SELL Locker

Point for performance, not for the pocketbook, this contractor advises. A newcomer to the locker sales field, his record proves the soundness of his methods. Read them and profit



DID you know that four degrees variation of temperature in a locker plant will squeeze all the juice, flavor and goodness out of a porkchop? Fluctuating temperature, which alternately expands and contracts the

meat, is about as effective as a means of progressive dehydration as if you used the porkchop like an accordion.

Next in importance is the packaging of the product to hold the flavor in. Properly sealed and kept in a non-varying temperature, it will taste like fresh meat when placed on the table.

These two factors were among the things that prompted Tom F. Campbell, president of the Southern Appliance Corp., New Orleans, to lead his company into the frozen food locker



Top of page: Section of locker room, Brackett plant. Above: Beef hanging in locker chill room. Right: Processing room. Trolley, tables, saws, etc., were all sold as part of the complete plant.

Plant Efficiency

—FORGET ABOUT PRICE!



Tom F. Campbell, president
of Southern Appliance Corp.

field last April, and incidentally to do a business totalling close to a quarter of a million dollars in the ensuing eight months.

After inspecting nearly a thousand locker plants preparatory to entering the field, Mr. Campbell says that he was convinced that most of the plants built during the past few years would be obsolete in five years. His firm recently completed the \$65,000 plant of

the Brackett Frozen Food Locker Co., Inc., Jackson, Miss., which has attracted much attention in the South.

In his investigation of the locker plant field, Mr. Campbell said he found many plants inadequately refrigerated and inadequately insulated, with little uniformity in methods of wrapping and in speed of freezing.

"I was convinced," Mr. Campbell said, "that a profitable and popular locker storage plant must be one that turns out a product with a preserved flavor, because it must eventually compete with other frozen products."

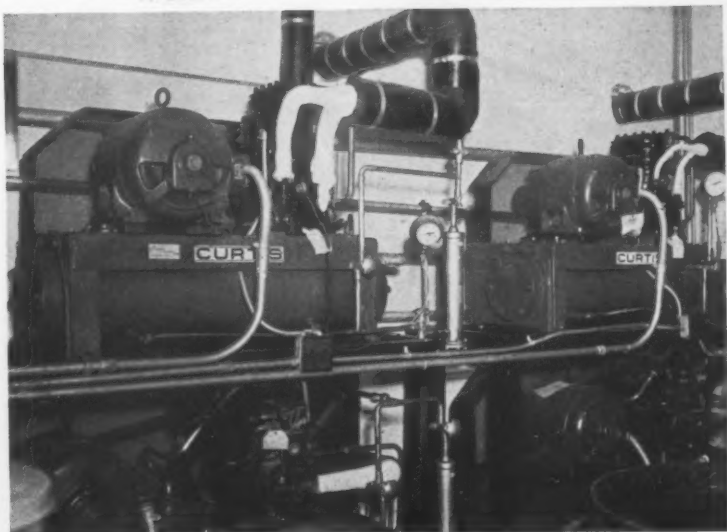
Southern Appliance Corp. then designed a quick freeze unit that did a quick freeze job in two and a half hours instead of the usual 18 to 24 hours. This went into the Brackett plant.

They made definite recommendations for packaging that would seal the product to prevent escape of flavors and cut down possibility of "freezer burn," a form of dehydration.

One of the troubles with most locker plants, Mr. Campbell said, and where much of the flavor of the food is lost, is in "progressive dehydration," caused by a fluctuation in temperature up or down of more than 4°F.

In designing the Brackett plant, Southern Appliance determined to eliminate all objectionable features. They designed adequate refrigeration

Left: Exterior of the Brackett plant. It has 830 lockers, represents investment of \$65,000. Below: Part of the compressor equipment serving the plant.



Typical cost-and-income sheet prepared by Southern Appliance for locker prospects. This one is for a 200-unit operation.

* * *

in the plant, operating the locker room at 0°F. with an allowable variation of only one degree, and installed recording thermometers so the locker customers could know the actual temperature in the plant at all times. Thus, a claim by any customer of a period of dangerous temperature may easily be answered by thermometer records.

One of the most important things in locker plant merchandising is to sell the owners or the cooperative contemplating the plant on the idea of efficiency, adequate refrigeration and to forget about price, Mr. Campbell says.

Another theory of Mr. Campbell's is that an adequate locker plant of itself is not enough. It needs to be a complete food processing plant, equipped with the latest and most efficient equipment for processing meat . . . saws, tables, chicken pickers and other equipment. This insures maximum return from plant investment.

"Pilot" Plant Details

The Brackett plant has chilling rooms larger than normal, and a specially designed all-purpose storage room with definite humidity control for storage of vegetables, eggs, poultry, and other products, which allows the operator to take advantage of a surplus of any of these products.

Temperatures maintained at the Brackett plant are 0°F. in the locker room and -25°F. in the quick freezer. Locker room is served by a pair of 5 H.P. units, with blower units located at either end of the room to insure even distribution of air. Two 7½ H.P. units also are used in the plant, one of them to handle the sharp freeze room, which is equipped with plate coils and a blower unit, and the other to provide cooling for the meat curing room, chilling area, and the meat aging and storage space.

The Brackett plant is a complete food processing unit, with smoke house, chicken pickery and other facilities. Chilling and aging areas are separated by a canvas curtain, and are served by blower units located along one wall of the room. Locker room has two blower units at either end, and houses 830 drawer and door-type compartments. Six inches of cork-

Projected Anticipated Revenue—200-Unit Plant			
200-Locker plant with Building.....	9,000.00	10,000.00	
no building	6,500.00	7,000.00	
200 Locker plant Doors 15" x 24" x 30"			
Drawers 18" x 24" x 30"			
40% drawer locker rentals @ \$15.00 per locker per year.....	1,200.00		
60% door locker rentals @ \$13.50 per locker per year.....	1,500.00		
Processing income estimated at 2.75¢ of products per locker per day @ 3¢ per lb.—for cutting, wrapping, freezing and placement in owner's locker.....	5,200.00		
Profit from sales of bulk meat to locker owners estimated 30% of total products handled at 3¢ per lb.....	1,560.00		
TOTAL INCOME FROM LOCKER SERVICES ONLY..	9,460.00		
Added revenue from Sources other than from Lockers and Processing for Lockers:			
Cutting, curing and pickling 350 hogs per year per 100 lockers 700 hogs @ 25¢ average @ 4¢ per lb. — × 175000#...	7,000.00		
Making and selling sausage—Hog head cheese and rendering lard	1,000.00		
Killing, dressing and freezing chickens. Estimated 30 per locker per year @ 15¢ each.....	900.00		
Miscellaneous revenue, sales of frozen foods, preparation for home freezers, etc.	1,000.00		
TOTAL PLANT CAPACITY REVENUE.....	19,360.00		
PLANT OPERATING AT 75% CAPACITY.....	14,500.00		
Operating Expense			
Plant manager	2,400.00		
Power & Light	480.00		
Two men Helpers	2,000.00		
Insurance & Taxes	350.00		
Miscellaneous Expense	800.00		
	6,030.00		
Depreciation 5% of \$10,000.00 plant cost.....	500.00		
	6,530.00		
TOTAL EXPENSE	6,530.00		
Net anticipated profit when plant operates at 75% of Capacity..	\$7,970.00		

board insulation is used in outside walls of refrigerated areas.

In selling the plant, Mr. Campbell said, they did not just assist the company buying it, but offered perfect, detailed plans, all operating equipment. They undertake to insulate all rooms designed by them, to supply and install adequate refrigeration and guarantee to accomplish certain results.

Sell the "Extras," Too

They offer to supply, in their detailed plants, all operating equipment such as meat grinders, meat saws, various cutting tools, heavy duty preparation tables, wash vats, electric chicken picking machine, scalding vat, kill tables and many other items.

A selling point under the Southern Appliance system is that the owner can walk in and start operation when they have completed their contract.

In the case of cooperative groups (or any other inexperienced company for that matter) they have the answer to the problem, "who will we get to run it?"

Now, Mr. Campbell tells them, "select the man you want to operate the plant, and we will place him in the Brackett plant in Jackson, Miss., for two weeks." There he will be instructed in the entire operation of the plant under the supervision of Mr. Brackett, who follows the system endorsed by Seacorp engineers. Southern Appliance Corp. pays for this service, and gives it free to the buyer of a locker plant.

The plant at Jackson has been so successful that officials of the Louisiana State Marketing Commission, a branch of the government responsible for handling surplus foods and even-

Continued on page 33



E. L. Hinchliff has been appointed to the sales staff of the refrigeration division of Amana Society, Amana, Iowa, announces George Foerstner, general manager.



Mr. Hinchliff has had wide experience in the public utilities and appliance merchandising fields. He will devote his efforts mainly to the marketing of the Amana home freezer line. Three freezer units have been announced by Amana—5 cu. ft. and 9 cu. ft. cabinet models, and a walk-in freezer-cooler described as a "complete private locker plant."

J. S. Bartlett has resigned as managing director of the Electric Institute of Washington, D. C., to accept the position of assistant commercial manager of the Potomac Electric Power Co.

Pending the appointment of a new managing director, **William G. Hills** will be in charge of the affairs of the Institute.

John F. Lebor has been elected secretary of York Corp. Mr. Lebor, now treasurer of the company, combines the duties of both offices and will succeed the late Vincent Keesey who, until his death, served as secretary and general counsel.



Mr. Lebor joined York in 1940 as assistant to the executive vice-president. Before that he was engaged in finance work for a period of 10 years in the firm of Scudder, Stevens & Clark and the Radio-Keith Orpheum Corp. He was named assistant treasurer of York in 1941 and treasurer in 1944.

Lt. W. B. Henderson, USNR, formerly executive vice-president of ACRMA, has returned to the United States after a tour of duty with the U. S. Naval Air Forces in the South Pacific. He has been posted to temporary duty in the Bureau of Naval Personnel in Washington, D. C.

Ward R. Schafer has been elected vice-president of Edison General Electric (Hotpoint) Appliance Co. in charge of sales. He has been with Hotpoint since 1923, when he joined the company as an engineer in the commercial cooking division. Later he served as manager of product service. In 1943 he was named manager of the western sales region, and later was placed in charge of all Hotpoint sales. His headquarters will be in Chicago.

Joe Moore has joined the Ansul Chemical Co. at the firm's district office at Indianapolis, where he is working with Tom Plouff, district office manager, in the sale of Ansul refrigerants. Mr. Moore's first work was with a number of industrial con-



cerns in Evansville, Ind., and his last connection was with a refrigeration company as branch manager in lower Michigan.

At present his home is at Adrian, Mich., but he plans to move to Indianapolis as soon as arrangements permit.

H. J. Kinkade has joined the contract products division staff of Young Radiator Co., Racine, Wis. He will handle special work on evaporative cooling and similar type equipment. Formerly he was manager of evaporative cooler sales for Fairbanks Morse Co., Chicago.

Jesse W. Page, Jr. has been elected a vice-president of Buensod-Stacey, Inc., New York City, and will be in charge of the new branch office and shop of the company in Charlotte, N. C. Physical assets of Page & Co., of which Mr. Page was owner, have been acquired by Buensod-Stacey. The new division will continue as a distributor of commercial refrigeration and air conditioning. **R. O. McGary**, Buensod-Stacey vice-president, will be in charge of operations of the southern area.

Robert C. Wright, former commercial advertising specialist, has been appointed manager of commercial advertising for Frigidaire Div., General Motors Corp. **Insko Williams**, former acting manager of displays and exhibits has been appointed manager.



Mr. Wright

Mr. Wright has been associated with Frigidaire for 18 years, devoting a large portion of his time to advertising activities relating to the commercial refrigeration and air conditioning market.

Austin Jones, formerly research and development engineer of Kerotest Manufacturing Co., manufacturer of valves and fittings, has been named Toledo district manager with headquarters at 1743 W. Central Ave., Toledo 6. Mr. Jones will supervise Kerotest sales in the Ohio, Michigan, Indiana and central Kentucky areas.

Ellis L. Spray has been elected a vice-president of Westinghouse in charge of the Elevator and Air Conditioning Divisions of the company, which supplanted the Westinghouse Electric Elevator Co. effective April 1. Mr. Spray formerly was vice-president and general manager of the Elevator Co.

Ross Rathbun, formerly manager of air conditioning, has been named manager of the expanded Air Conditioning Division, which now includes the Precipitron. **George F. Begoon** has been named manager of the latter department.



Service Ribbons

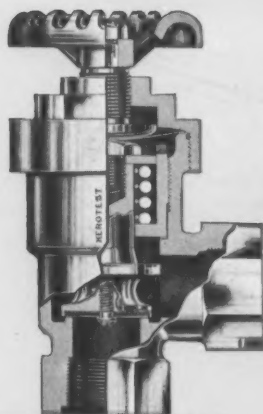
to the **JOBBER**

For his untiring efforts
in supplying Vital parts
and equipment during
this Wartime Emergency

Heaps of glory to him! His job has been a tough one, too—priorities and restrictions too long to list; long forms in triplicate copies (and often more); sons and daughters in the service; can't get good help—up before dawn and burning plenty of midnite oil. He's begged, pleaded and borrowed (from fellow jobbers) to get the parts and equipment you needed so badly . . . and he'll keep right on battling 'till Victory Day—even though these needed parts should become even more difficult to find.

So for all your requirements, always contact your Kerotest *jobber* **FIRST** for dependable Brass Valves, Fittings and Accessories for Refrigeration and Air Conditioning use.

KEROTEST MANUFACTURING CO.
PITTSBURGH, PA.



TYPE 522 VALVE

KEROTEST

*Valves. Accessories. Fittings
for Refrigeration. Air Conditioning*

ORIGINATORS

OF THE PATENTED PACKLESS DIAPHRAGM VALVES . . .

KEROTEST

LOCKER SELLING . . .

Continued from page 30

ing out the supplies, has asked for details and specifications. They may either send prospects or buy one themselves in order to peg farm prices and stop glutting of the market.

The modern plant, according to Mr. Campbell, provides an abattoir in connection. The biggest value of a locker plant to the farmer and stock raiser is when he can drive his meat to the locker plant on the hoof. There it is inspected, killed, chilled and cut up and processed. A plant of this type will return the most on the investment, because it provides more services.

Most of today's prospects come from county agents, Mr. Campbell said. Following the news of talk about a plant, they usually arrange to talk with some of the principals of the company. When a new cooperative is being organized, it is necessary to get members together and sell them on the idea of an adequate building, adequate refrigeration and insulation.

For Sound Financing

Before construction is undertaken, the cooperative should have in its possession at least half of the money required for the complete plant, Mr. Campbell said.

With one-half cash, the balance of the money is easily financed and usually can be handled with a bank in the town in which the locker plant is to be situated.

In most all cases the plans for a locker plant should provide for a new building of concrete block, tile or brick construction. The buildings designed by Seacorp save considerable construction expense because of the system of using one height of ceiling. This is possible at 10½ feet instead of 12 by recessing for the trolley track, and other innovations. There is no attic, and the upper part between ceiling and roof is thoroughly and heavily insulated.

One of the most important things to guard against in a good locker plant, according to Mr. Campbell, is variation in temperature. Many operators think that as long as the temperatures are safe the food will be good.

Variations of more than 2° in the temperature either way causes the food to contract and expand. This con-

stant "movement" of the food squeezes out the juices which are in it—and when you've lost the juice, the taste has fled. That's why packaging and sealing is so important.

The locker business as "big ticket" business for the appliance and refrigeration company is ideal, Mr. Campbell said. However, adequate engineering is a "must" for this work. If you haven't the training yourself, arrange to obtain the services of a competent refrigeration engineer on a consulting basis. Some equipment manufacturers also offer engineering help.

The Rebuilding Field

Another field where the refrigeration dealer can find profitable business is in rebuilding locker plants that have not been adequately refrigerated and insulated, Mr. Campbell thinks. Some of the newer plants, built less than a year, are not able to keep a zero temperature in the locker room throughout the 24 hours, he said, and many of the owners who have been sold a package of locker plant at a price, are now ready to get efficiency at any cost that will protect a further investment.

Here are some of the figures used in closing sales on locker jobs and in furnishing information to the customer. Compressor capacity necessary is about 2 H.P. to 100 lockers. Rates charged should be such as to encourage full use of the facilities, but must cover cost and furnish a reasonable profit.

Figures Don't Lie

Mr. Campbell has made up several sheets showing projected costs and revenue from various size plants. Projection of a 200-locker plant (see page 30) shows revenue from locker services only at \$9,460, with an additional \$10,000 derived from other services. Assuming the plant to operate at an average of 75% capacity, this would mean an annual gross income to the operator of \$14,500.

Interestingly enough, \$1,000 of this revenue is estimated to come from sales of frozen foods, and preparation of foods for storage in home freezer cabinets.

Ability to find and to furnish complete and reliable information to prospective groups is one of the essentials to completing sales. Prospects have many questions to ask—and to sell them, you must have the answers—the right ones.

Proven Pittsberg Products

SULPHUR
DIOXIDE

METHYL
CHLORIDE

METHYLENE
CHLORIDE

Proven for
uniformity, and
low moisture
content

Your inquiries on other
chemicals are invited

**PITTSBERG
CHEMICAL CO.**

3100 East 26th St., Los Angeles 23, Cal.

SALES AGENTS FOR:

KINETIC CHEMICALS
FREON 11—FREON 12
FREON 22

basing this on pre-war practice, modified by the trend toward the increasing use of the self-contained packaged equipment. That portion of units which it was estimated would not have a complete condensing unit was omitted in Table 2.

Another large market which should not be overlooked, and which is not included in this tabulation, is the replacement market through distributors, refrigeration jobbers, and service engineers.

The tabulation of the Task Committees' Reports is given in Table 1; the estimates of the dollar potentials, in Table 2. The figures show well over a one-half billion dollar potential annual market post-war for unitary or self-contained packaged equipment.

F. J. BOMMER TO HEAD FREEZER ASSOCIATION

F. J. Bommer, Jr., of the Sanitary Refrigerator Co. of Fond du Lac, Wis., was elected president of the

Farm and Home Freezer Manufacturers Association at a recent meeting of the group in Chicago.

New vice-president is J. K. Noel, Jr., of Victor Products Corp., Hagerstown, Md.; secretary is S. C. Bell of

Quillen Bros. Refrigerator Co., Indianapolis; treasurer is J. E. Wilson, Jr., of Wilson Cabinet Co., Smyrna, Del. E. G. Vail continues as executive secretary.

SUPER-COLD BUILDING

Contract has been awarded for construction of a new factory building of reinforced concrete at 850 East 59th St., Los Angeles, for the Super-Cold Corp.

The one-story building, to cover an area of 187 by 242 feet, will be equipped with three traveling cranes and a monorail and will cost \$85,000.

TENNEY ENGINEERING HAS NEW OWNERS

Monroe Seligman, Cleveland A. Sewell, and Saul S. Schiffman are the new owners of Tenney Engineering, Inc., Montclair, N. J., firm which has specialized in the manufacture of low temperature testing equipment.

The company plans to manufacture a more general line of refrigeration equipment in the future, specializing on coils and thermostatic expansion valves.

Mr. Seligman, the president, was formerly sales manager of American Coils Co. Mr. Sewell, vice-president, was plant superintendent of the same company, and at one time was in charge of research for Larkin Coils. Mr. Schiffman, secretary-treasurer, held the same position with Liberty Fuel Oil Co. and Dornio Products Co. of Newark, N. J.

THE REFRIGERATION INDUSTRY

TABLE No. 2

ITEM	Estimated Number of Units in Table No. 1, col. 4, to have complete condensing units	Estimated Average Wholesale Price	\$ TOTAL (Wholesale)
Refrig. Soda Fountains	30,000	400.00	12,000,000.00
Bulk Coin Units	5,000	600.00	3,000,000.00
Bulk Manual Units	15,000	200.00	3,000,000.00
Bulk Beer Coolers	100,000	200.00	20,000,000.00
Ice Cream Cabinets	125,000	200.00	25,000,000.00
Bottled Beverage Coolers	150,000	200.00	30,000,000.00
Water Coolers	95,000	125.00	12,000,000.00
Display, Reach-In, Walk-In Coolers	271,000	600.00	162,000,000.00
Commercial Frozen Food Cases	75,000	300.00	22,000,000.00
Farm Freezers	30,000	300.00	9,000,000.00
Locker Plants	1,500	3,500.00	5,250,000.00
Home Freezers	500,000	150.00	75,000,000.00
Room Coolers under 2 h.p.	100,000	125.00	12,500,000.00
Room Coolers over 2 h.p.	23,000	500.00	11,500,000.00
Annual Indicated Potential—Total Wholesale Volume			\$402,250,000.00
Assumed 33 1/3% Mark Up			134,083,000.00
Annual Indicated Potential—Total Retail Volume			\$536,333,000.00

AMANA HOME FREEZERS

THE COMPLETE LINE

With Amana you are READY to cash in on a GREAT NEW APPLIANCE MARKET. The three modern AMANA FREEZERS fit the needs and pocketbooks of ALL USERS. GET FACTS on AMANA. It's a good name to be associated with. Write or wire.



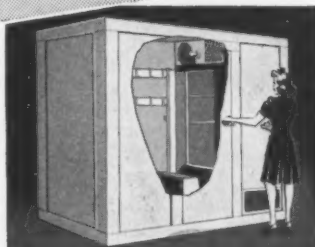
Refrigeration Division

AMANA SOCIETY
AMANA, IOWA

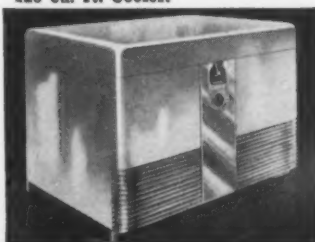


Model 50
5 CU. FT. CABINET.
Accessible . . . convenient . . . counter-balanced lid. No waste space.

Model 90
9 CU. FT. CABINET.
Full view counter-balanced top. Contents easily accessible. 100% usability of storage space.



Model 200 Freezer-Cooler
A complete private Locker Plant.
23 cu. ft. sharp freezing capacity.
120 cu. ft. Cooler.



NOT AS TOUGH . . .

Continued from page 19

won't keep running, and we know it takes work to keep it going. Therefore, nothing divided by something is 0.

On the other hand, if the compressor discharge was closed off and we continued to run the compressor until it could no longer take in gas and compress it into the head, the compressor would get to a condition where it was no longer doing work on the gas. Actually, the compressor would do the work on the gas during the compression stroke but the gas would tend to re-expand and do work on the piston during the suction stroke. Since there is no gas output, there is no useful work done, and the output is 0. It very definitely would take work to turn the compressor, however, so the mechanical efficiency would be 0 divided by something (input) or 0%.

What Goes In Comes Out

However, at any difference between suction pressure and discharge pressure between 0 and the head pressure with the discharge closed off, some gas is moved through some difference in pressure. Consequently, some work is done, and this amount divided by the input gives a definite mechanical efficiency. In general, then, we could expect the volumetric efficiency and mechanical efficiency to vary as shown in Figure 1, when the difference in pressure varies from 0 to the maximum.

If energy is put into a compressor in foot-pounds of work, it must come out in some way. When the mechanical efficiency is anything except 0, some of the energy comes out in the gas itself or in the useful output of the compressor. The rest of the input comes out as heat resulting from friction.

In general, heat resulting from friction in a compressor is traceable to two sources: pure mechanical friction, and gas friction.

In tracing mechanical losses from the motor pulley to the compressor outlet, we find the following sources of energy losses:

1. Motor pulley to belt friction.
2. Energy used in flexing belt.
3. Belt to compressor pulley friction.
4. Compressor bearing friction.

- (a) Main bearings.
 - (b) Connecting rod and crank or eccentric and strap.
 - (c) Wrist pins.
 - (d) Thrust bearing.
5. Piston to cylinder wall friction.
 6. Seal friction.

Of the above losses, it is probable that from 5 to 10% of total motor output is accounted for by 1, 2, and 3, while the rest of the losses may add up to 20% to 35% in a good compressor in normal refrigeration use. This leaves a difference of from 55% to 75% available for useful work in

a normally operating compressor, not counting gas friction losses.

The gas friction losses are those which occur due to throttling or wire drawing. In general, such losses should be small, say not more than 5%. These losses may be due to:

1. Suction inlet port—too small or partially plugged.
2. Suction check valve in piston or head—too much spring loading, port too small, or valve opening insufficient.
3. Discharge check valve in head—too much spring loading, port too

ANSUL



ST IN REFRIGERANTS

Ansul was first in America to produce Sulfur Dioxide for refrigeration (1915).

At the demand of the growing fractional-tonnage household refrigeration industry, Ansul began production of Methyl Chloride.

Ansul still analyzes *individually* every cylinder before it is shipped because—

The purity, dryness, and safety of handling of Ansul refrigerants are still top standards of a high-specification industry which Ansul is proud to have pioneered.

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ANSUL CHEMICAL COMPANY

"NOW IN OUR 30TH YEAR"

MARINETTE, WISCONSIN

AGENTS FOR KINETIC'S "FREON-11," "FREON-12" AND "FREON-22"

NEW '45 EDITION



REFRIGERATION SERVICE MANUAL

"This book really helps you earn more!"

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- Service Men
- Maintenance Men
- Dealers
- Engineers

\$2.00 Written by H. P. Manly, refrigeration authority, this NEW book covers refrigeration problems in conversational language so that its 300 pages and 138 diagrams and illustrations can't miss being a real HELP TO YOU. Covers practically every operation in field service and shop operations which may be required. Includes domestic types of refrigeration, and fully and completely explains the commercial types in small and medium sizes, such as used in markets, milk depots, soda fountains, flower shops, etc., as well as in many air conditioning systems.

INCLUDES GAS REFRIGERATION
The new '45 Refrigeration Service Manual covers repairs and maintenance of gas refrigerators and systems . . . Only leaves nothing to doubt . . . explained clearly and concisely. **\$2.00**
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Gentlemen:
Please send me the NEW complete '45 edition of Refrigeration Service Manual . . . G.O.B. If book is not entirely satisfactory, I'll return it in 5 days and you will refund my money. I'll pay the postman \$2.00 plus five cents postage. **SAVE 10%.** Enclose \$2.00 and we'll pay postage, saving you approximately 10%. Same Money Back Guarantee.
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small or insufficient valve opening.

4. Discharge port too small, or partially plugged.

In general, any change in conditions which tends to lower volumetric efficiency, also tends to lower mechanical efficiency. This is true because as the volumetric efficiency decreases, the quantity of gas handled decreases, and therefore the useful work tends to decrease. On the other hand, the bearing losses tend to remain constant if the speed remains constant, and therefore as the useful work decreases with losses remaining constant, the mechanical efficiency decreases.

Result of Throttling Losses

Throttling losses decrease mechanical efficiency in that they make the compressor piston actually do more work without increasing the overall output of the compressor. An illustration of this point can be shown graphically.

Figure II shows a typical pressure volume diagram for a compressor. Suppose the compressor is to handle F-12 from a pressure of 50 p.s.i.a. to a pressure of 160 p.s.i.a. and temperature conditions as used in our horsepower problem.

In Figure II it is noted that the calibrations are such that each square is 20 p.s.i. high and .1 cu. ft. wide. One p.s.i. = 2880 pounds per square foot times .1 cubic feet = 288 foot pounds of work.

$$\left(\frac{2880 \text{ lb.}}{\text{ft}^2} \times .1 \text{ ft.}^3 = 288 \text{ ft./lbs.} \right)$$

At A we have a pound of gas at suction pressure, and from A to B it is compressed to the discharge pressure. From B to C it is being discharged into the condenser with volume C, the clearance volume, remaining in the compressor cylinder. From C to D the gas remaining in the cylinder is re-expanding to the suction pressure and then new gas is brought in from D to A.

In compressing from A to B the work done is represented by the area under AB or ABB'A'. If we estimate this area as 26 squares, the work done in compression is $26 \times 288 = 7480 \text{ ft. lbs.}$ (slide rule). In delivering the gas from B to C the work done can be estimated from the area under BC, which we'll say is 19 squares or $19 \times 288 = 5470 \text{ ft. lbs.}$ The total work done in compressing and delivering is then $7480 + 5470 = 12,950 \text{ ft. lbs.}$

The gas in re-expanding from C to D does work on the piston amounting to approximately 3 squares or $3 \times 288 = 864 \text{ ft. lbs.}$ The fresh gas on



Investigate O-Kay plates—the finest cooling devices available to the refrigerator industry. Ideal for freezer cabinets, storage rooms, salad pans, milk coolers—all low temperature applications. Write Kay, today!

O-KAY COILS

KAY PRODUCTS COMPANY, Division of Tyler Fixture Corp. NILES, MICH.

KAY PRODUCTS COMPANY, Dept. R1-5, Niles, Michigan.

Check information on O-Kay () Plate Coils () Forced Convection Unit Coolers () Panel Coolers.

Name

Address

SUB-ZERO ROOM TESTS LAND MINE DETECTORS

Regardless of what the temperature may be outside, land mine detectors are tested for sub-zero sensitivity at the Horn Signal Mfg. Co., New York City, in a room whose temperature can be dropped to 40° below zero. The Carrier refrigeration equipment was installed by Consolidated Conditioning Corp., Mount Vernon, N. Y.

Because detectors are sensitive to iron, the company's test rooms are constructed of non-metallic materials. The arctic room is built within another room and the ducts to distribute the conditioned air are made of asbestos mill board.

To simulate weather in tropical combat areas, test rooms whose temperature rises as high as 175° are provided.

These studies in the "all weather" test rooms supply data on how heat and moisture affect the sensitivity of the devices.

being admitted works on the piston from D to A an amount equal to about 18 squares or $18 \times 288 = 5180$ ft. lbs. The work done on the piston is then $864 + 5180 = 6044$ ft. lbs.

The net work done by the compressor is then $12,950 - 6044$, or 6906 ft. lbs.; or $6906 \div 288$ or about 24 squares as shown by the shaded area.

In the Old Days

In the old days of refrigeration, some compressors did not use a piston valve or a suction check valve in a divided head. Instead, the gas was admitted into the cylinder through a port in the cylinder wall when the piston uncovered the port at the bottom of its stroke. In such a compressor the re-expansion line would extend to about point E, and then as the port opened the gas would be throttled into the cylinder. In this case the net work done by the compressor would include all the heavily shaded area plus the work shown by the lightly shaded area. This is due to the fact that the gas admitted to the cylinder is not admitted at such a point that it can do work on the piston and thereby decrease the net work done by the piston.

By the use of the pressure volume diagram, other causes of decrease in mechanical efficiency could be illustrated which result from gas throttling, and which thereby increase the net work done by the compressor without increasing the compressor output; which, of course, lowers mechanical efficiency.

The Causes Summarized

Now, if Little Elmer will come out of his corner, we'll summarize some of the things which tend to reduce the mechanical efficiency of a compressor:

1. According to Figure I, mechanical efficiency is dependent upon the difference between suction and discharge pressure. The range of pressure differences at which the compressor is most efficient may depend upon the type of a compressor and suction pressure used. In general it is not considered practical to compress to a discharge pressure more than 10 times the suction pressure in p.s.i.a.

2. Mechanical efficiency is dependent upon mechanical friction losses. A lack of oil, rough bearing surfaces, or gummy bearing surfaces will decrease efficiency considerably.

3. Any of those things which tend to reduce volumetric efficiency, in

general, tend to reduce mechanical efficiency as well.

4. Any throttling in the compressor lowers mechanical efficiency, by increasing the net work input without increasing the useful work output.

BAUER-KNAPP APPOINTED AMANA DISTRIBUTOR

Bauer-Knapp, manufacturers representative of Hollywood, Calif., have been named direct factory representatives for Amana refrigeration equipment in the states of California, Oregon, Washington, Idaho, Utah, Ne-

vada and Arizona. Bill K. Storey is president of the company, and John J. Pollen is director of sales.

GUILBERT HEADS FAN MAKERS

H. M. Guilbert of the B. F. Sturtevant Co. was elected president of the Propeller Fan Manufacturers Association at the group's recent annual meeting in St. Louis.

E. C. Englert of Hartzell Propeller Fan Co. was chosen vice-president. V. C. Shetler continues as secretary-treasurer.



NIBCO WROT Fittings are formed in one step from straight copper tubing. They are strong, light in weight and dense in structure . . . impervious to gases. Because every fitting is perfectly formed and absolutely "round and square," they are easier to use in production. Laboratory Control and individual plug testing assure close tolerances. You can eliminate service troubles by using vibration-proof and corrosion-proof NIBCO WROT Fittings. Write for complete catalog.



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VALVES AND FITTINGS SINCE 1904



"CLEAN-A-COIL"

FOR
DE-SCALING
CLEANING

**WATER COOLED
CONDENSERS,
COOLING COILS,
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**NOT CLASSIFIED AS
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*Write for Descriptive Literature
or Consult Your Local
Jobber*

Standard Solvent Co.

4740 WOODLAWN AVE.
CHICAGO 15

THEY KNOW . . . Continued from page 15

load, cleaning up the hot spot and accomplishing a double job for you—keeping your customers satisfied and your service men employed to best advantage.

Because of the current shortage of men, Johnson is working its zoning system somewhat differently than it hopes to later on. Zones where experience shows calls will not be heavy are grouped into twos, and one man covers them; the thickly populated zones have one man in each of them.

We mentioned before that, because of the zone routing plan, service men for Johnson really know their way around. That statement goes in more ways than one—for George Johnson, president of the company, and a leader in the Detroit Refrigeration Service Council and Refrigeration Contractors Association, has set up a system of training that aims at having service men strictly up to date as far as doing their work is concerned, too.

Except during the warmest summer months, there's a "school" under way all the time. One of the company's

veterans, Byron Kirk, has charge of the sessions, which are held one night a week. Classes are designed to equip newcomers to take their places as independent qualified workmen in the shortest possible time.

The company handles both household and commercial servicing, and commercial installation work as well, with a total of 46 persons on the payroll, including the office staff. On household and commercial service, 23 men work outside the office, and eight men handle shop repairs on motors, cabinets, and cooling units. Parts department requires the services of three men, and there's a driver who handles pick-ups and delivery work. Don Hoover, brother of Ken, manages the shop and parts department. Installation work is handled by four additional men, who are equipped to

BIG GAINS SEEN FOR REFRIGERATED TRUCKS

"A tremendous increase" in over-the-highway transportation of refrigerated food is predicted by A. K. Tice, vice president in charge of sales for Fruehauf Trailer Co., Detroit. "Only the war holds back a vastly increased production of refrigerated truck-trailers capable of transporting meat, frozen foods, fish and other perishables," Mr. Tice declares. "Ingenious new refrigeration devices which maintain a constant temperature in the vehicle in all climates and under all weather conditions will spur this demand."

take care of all types of major jobs.

With a crew as large as this, keeping up with the manpower situation has been almost a full-time job. Training cost the company more than \$2000 last year alone, and the price per man who stayed with the job after his schooling was over was rather high. Always on the look-out for trainees, Mr. Johnson has offered prizes to his present men if they'll bring him in new men to work for the company. Even this hasn't been too productive, and it hasn't been because of lack of effort. There are simply too many places where a man can go to work these days.

On installation work, the company handles jobs for other local concerns as well as on its own. One of its most recent jobs has been a big low temperature food installation for Packers' Outlet, in Pontiac.



"FARTHEST NORTH" in Modern Refrigeration

DOLE Plate Type Evaporators have won wide acceptance, give perfect refrigeration, satisfaction and years of service. The most modern, efficient and economical method of refrigeration. There is a Dole plate for every refrigeration purpose.

*Write for catalogs, engineering assistance,
or a representative to call—No obligation.*

Dole Refrigerating Co., 5910 N. Pulaski Rd., Chicago 30, Ill.
N. Y. Branch: 103 Park Avenue, New York 17

"CAVE" COOLING SYSTEM ONE-FIFTH COMPLETE

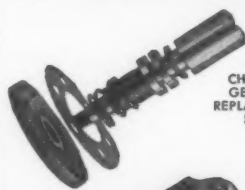
Installation of cooling equipment at the Kerford Quarry, Atchison, Kan., the government's huge "underground cold storage warehouse," is about one-fifth completed, W. C. Costello of the Defense Plants Corp. declares.

P. S. Egbert, in charge of the installation, said the cooler will have eight to nine acres of floor space. Forty per cent of the concrete flooring already has been laid, with food stored as rapidly as a room is completed.

The present average temperature of 60°F. is expected to be reduced to 30°F. when installation of cooler equipment is completed.

Postwar, the company plans to continue to be a service-first organization, with commercial installation and sales expanded to handle increasing demand in those fields. Naturally, the company has an eye cocked at the sales field, too . . . but things along that line haven't worked themselves out enough to talk about yet.

Why the Trend Is Strong to CHICAGO SEALS and VALVE PLATES



CHICAGO
GENERAL
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ONE OF
CHICAGO'S
VALVE
PLATES

Chicago Seals and Valve Plates make a better servicing job on all refrigerators, in less time, at less cost, at more profit . . . and more service men and more jobbers are finding out this fact every day.

CHICAGO SEAL CO.

20 North Wacker Drive, Chicago 6, Ill.

It's a safe bet, though, that the company won't pass up any angles that will fit into what it feels is its place in the scene. But that scene, primarily, will be built around service.

Mr. Johnson has plans aplenty for improved shop equipment, large shop facilities, and the latest tools and equipment for outside service men, too. For one thing, he hopes to be able, with properly equipped trucks, to handle a larger share of in-between repair work outside the shop, leaving the latter free for major work. He will have, too, a truck equipped for

handling sealed unit changes in the field.

Also, he'll keep up his training work, and hopes, when manpower turnover slackens, to field a service staff strictly top-drawer as far as technical qualifications are concerned.

And he has plans for a larger organization, too. Five Johnson mechanics are now in the armed services. They'll all come back, Mr. Johnson hopes—and a lot more like them. The way he pictures the future, there'll be plenty for all of them to do in refrigeration.

Necessary

on multiple refrigeration systems and where close control is wanted on individual units

Wide Range of Adjustment

...from 15 inch vacuum up to 55 lbs. gauge

Close Temperature Control

valve is responsive to pressure changes of 1/10 lb.

Large Gas Capacity

with very low pressure drop

Convenient

service gauge connections for easy, accurate adjustment

Quality

Temprite is small, rugged in construction and extremely sensitive in operation

Available

from stock on orders rated AA-5 or better

5 Models

with capacity ranging from 4000 BTU's per hour up to 250,000 BTU's per hour



TEMPRITE PRODUCTS CORP.

Originators of Instantaneous



Liquid Cooling Devices

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DETROIT, MICHIGAN



Before a coil of Revere Dryseal Copper Tube moves into the annealing furnace, its interior is "purged" of oxygen.

Moisture
can be a
bad actor...

Good commercial refrigerants never attack refrigeration or air-conditioning apparatus by themselves. But some of them team up with moisture to produce corrosive products that can cause serious trouble. That's why it's so vitally important to use tube with a bone-dry interior... why Revere Dryseal Copper Tube has all moisture removed and sealed out!

Available now, this tube for refrigeration, air conditioning, heat control, bottled gas and many other purposes, is sold by Revere distributors everywhere. It comes in coils of 25, 50 and 100 feet, and each length is individually treated to remove all interior moisture, then sealed at both ends.

This is but one of the "kid glove" treatments given Revere Dryseal Cop-

per Tube so that it will help to protect your installation against trouble. It is made of deoxidized copper and is carefully kept free of oxides through every manufacturing step. In annealing this tube to dead softness, for example, the heating is done in a controlled atmosphere.

It comes in sizes from $\frac{1}{8}$ " to $\frac{3}{4}$ " O.D. with .035" wall. Also available for refrigeration, air conditioning and a variety of other services is Revere Sealed End Copper Tube. Each end is plugged and taped against injury and contamination.

For Revere Dryseal or Sealed End Copper Tube, call your Revere distributor. The Revere Technical Advisory Service is always ready to help with your problems.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

Executive Offices: 230 Park Avenue, New York 17, N. Y.

Use of Ratings Under P-126 Tightened

Direction 1 to Order P-126, issued April 14 by WPB, prohibits the use of preference ratings assigned by the order to get any new condensing unit, any new cabinet or other insulated enclosure, any new low side units (such as unit coolers), or any new system containing any of these items. The only exception is where a hermetically sealed condensing unit is ordered for emergency maintenance or repair of a specific job, but not for inventory.

The direction does not affect the use of P-126 ratings to get repair parts for emergency maintenance and repair, such as controls, expansion valves, dehydrators, crankshafts, shaft seals, and other repair parts.

However, in the case of ratings applied under P-126 for new condensing units or any of the other items listed above, service agencies are required to cancel orders bearing such ratings immediately, or tell their suppliers that the orders are no longer to be treated as rated orders.

Dealers, distributors, and manufacturers who have accepted (or extended) orders for these items bearing such ratings, must not make delivery of the items covered. The direction requires that they cancel them or advise that they not be treated as rated orders; and that suppliers may not treat such ratings as valid, even if they are not cancelled, if they know or have reason to believe that they should be cancelled.

A service agency who has applied a rating under P-126 to get one of these items for a customer, or to replace in inventory any of these items delivered to a customer on a rated order, should immediately extend his customer's rating for the items ordered for this purpose, in addition to cancelling the P-126 rating.

This customer's rating could be one applied according to CMP-5 or 5A (and allowable under paragraph (d) of L-38), or it could be one obtained on WPB-1319, WPB-617, or GA-1456. If the service agency does this within the 90-day period allowed by Priorities Reg. 3, it will substitute for the cancelled P-126 rating.

Customers whose CMP-5 ratings are not high enough to get delivery in time should go to WPB field offices for help.

THE PRACTICAL

Refrigeration Engineering

MANUAL . . . by Harold Smith

VII. Frozen Food Processing (Cont.)

In both cases, the job can be done, and is being done every day. This added attention, however, does increase the work and responsibilities of the operator of the plant, and for these reasons is sometimes objectional. If forced-draft units are not used, the choice then lies with banks of plates, bare pipe coils, and sometimes finned coils. Bare pipe and finned coils also require considerable defrosting effort, while plates can be scraped off, which is usually considered less work than the defrosting operation and does not require as frequent attention.

The cost of adequate plate surface, however, usually involves considerably more investment than the other type evaporators, which is also a matter that may call for consideration. It is well to choose evaporators with enough surface so they can be operated on a 10° temperature differential.

When plate coil banks or bare pipe coils are used, considerable increased efficiency can be gained by using an auxiliary fan in the room to force circulation. This does not increase the defrosting problem, as in the use of a forced-draft evaporator, as the fan is an entirely separate unit and the flow of air is not retarded when the evaporator surfaces are frosted up. However, the frosting does slow down the rate of heat transfer somewhat.

In the larger locker plant operations, pickling or curing rooms, and sometimes smoking rooms, are a part of the operation. The smoking room, of course, requires no refrigeration, and the pickling room usually is held at a temperature of 38°, using a forced air unit.

There is no particular engineering problem involved in the pickling room. The product remains in the room for a period of several weeks, and the service load is usually low. Careful figuring of the load will usually be all that is necessary to get proper results.

The forced-air unit, being compact, is undoubtedly the preferred unit or evaporator to use, and either a separate condensing unit, or a hook-up with the condensing unit operating the chill room or the aging room, takes care of the refrigeration circuit.

Every progressive refrigeration man should keep his eye on the frozen food field. In the postwar period, the expansion of this industry should be great. First-hand knowledge of what makes up a frozen food installation is valuable information to have, and, better still, any personal experience in this field that can be gained by selling, installing, or servicing such an installation should help you to cash in on this business when it gets back into full stride.

VIII. Milk Processing

THE processing of milk is one of the country's great industries, and producing the milk leads all agriculture's activities and incomes.

Milk processing generally comes under two classifications: the

large commercial processors who gather milk from large surrounding areas and process in a central plant, and the smaller producing processors who handle only the milk produced on their own farms. Both follow similar

NINE DISTRIBUTORS ADDED BY BEN-HUR

Appointment of nine new distributors for its postwar three-model line of Ben-Hur farm and home freezers has been announced by Ben-Hur Mfg. Co. Included are:

Canfield Supply Co. of Kingston, N. J.; J. Geo. Fischer & Sons, Inc., Saginaw, Mich.; Gould-Farmer Co., Inc., Syracuse, N. Y.; F. C. Hayer Co., Inc., Minneapolis; Mead Farm Equipment Co., Omaha, Neb.; Morley

Brothers, Saginaw, Mich.; R. M. Wade & Co., Portland, Ore.; Youngstown Equipment Co., Boston; and York Supply Co., Dayton, Ohio.

PHILA. COOLING GROUP CHANGES SET-UP

The Air Conditioning Division of the Electrical Association of Philadelphia approved recommendations calling for changes in the organization and procedure of that group. Hereafter the name will be the Air

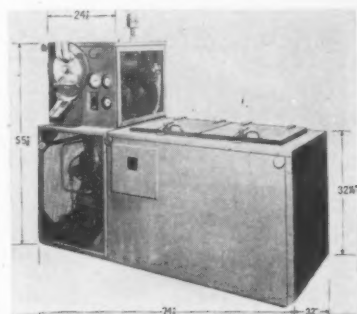
Conditioning and Industrial Refrigeration Division.

The office of vice-chairman will be added to the former list of officers which were a chairman and secretary. An executive committee of six is called for under the new organization plan, together with four standing committees. There are—a legislative committee, promotion and publicity committee, membership committee, and an outing and entertainment committee.

NEW ICE CREAM MACHINE CAN "FLY" INTO ACTION

An ice-cream machine for forward battle areas has been developed by the Quartermaster Corps which is nearly a miniature ice-cream factory in itself. It weighs only 1,200 lbs., occupies a minimum amount of space, and can be easily transported by truck or plane to spots hitherto inaccessible.

The machine is 79 inches long, by 32 inches wide and 55½ inches high. Frame and sheathing are aluminum,



and the insulation, which is cellular rubber, is half the weight of cork. Handles are provided along the sides so that the outfit can, if necessary, be moved by hand. It is equipped with both a 5 H.P. air-cooled gasoline engine and a 3 H.P. electric motor, in order that it can be powered by electricity wherever available, or driven by the gasoline engine when used in isolated spots.

The freezer has a capacity of 2½ gallons, and will produce a semi-frozen mix from the freezer in from 7 to 14 minutes, depending upon the outside temperature. It will operate in temperatures up to 120° F.

Storage capacity of the cabinet is 40 gallons either stored in 5 gallon cans, or packed in half-pint containers, but the freezer can produce twice as much as that in any eight-hour shift.

methods of processing.

We will first consider the problems of the smaller producer-processor, found most often in small communities.

Milk is a highly perishable product and must be handled carefully and under highly sanitary conditions, as bacteria development is very rapid and unsanitary conditions lead to serious trouble. All states have strict regulations governing the handling of milk which are rigidly enforced and closely supervised.

The temperature of milk from the cow approximates 98° F. It is important to lower this temperature at least to 50° within a period of 60 minutes after milking. The two most frequently used methods are cooling in a tank or milk cooler which contains a water bath held around 30°, or by running the milk over an areator which provides almost instantaneous cooling.

PROCESSING WHOLE MILK

In small communities whole milk, not pasteurized, is frequently bottled and sold. This is usually not permitted in the large commercial plants, in larger communities which receive milk from hundreds of different farms, as the possibilities of contagion are far greater and the spread of contagion would be more widespread than in the smaller communities. The factors necessary in working on a milk processing problem are shown in Table I.

Our first problem will be a small producer-processor who

bottles and distributes whole milk. The milk temperature from the cows is 98° F. Immediately after milking the milk is placed in a milk cooler, where it remains until the temperature is brought down below 50° F.

The milk cooler is usually a complete or self-contained unit having its evaporators built into the cabinet and a condensing unit, to take care of the cooler only, either mounted on the cabinet or installed nearby.

The bottles and crates are carefully washed and sterilized before being used and are usually at room temperature or around 80° F. when put in use. When the milk is cooled down to 50° the cans of milk are emptied into the reservoir of the bottling machine and the bottles are filled and capped automatically. As rapidly as the bottles are filled they are placed in milk crates holding a dozen bottles, and immediately placed in a storage cooler, where they are held until loaded on the truck for delivery to the consumer.

The storage cooler should be able to lower the temperature of crates, bottles and milk to between 35 and 40° F. at the time the milk is removed for delivery. The storage cooler should be a well-built insulated cooler, usually without windows and with one or two doors. The product load is to lower the temperature of the crates and bottles from 80° to 40° and the temperature of the milk from 55 to 60° down to 40°.

TABLE I

UNIT	K FACTORS		CRATES	
	MILK	BOTTLES	WOOD	METAL
1 lb.	.90	.13	.267	.047
1 qt. (2.15#)	1.94	.28	.575	.102
1 gal. (8.6#)	7.74	1.12	2.300	.410

WEIGHT TABLE

1 gallon water	8.33 lbs.	K factor	8.33
1 gallon milk	8.6 lbs.	K factor	7.74
1 gallon brine	9.6 lbs.	K factor	7.21

NOTICE!

AMCOIL NEW LOW PRICES

JOBBERs and DEALERs!
Handle the money-making AMCOIL line in your area. Write today for details of our attractive line of cooling units—a few localities are still open to qualified jobbers.

A RARE COMBINATION

The highest quality at Lowest prices

Improved manufacturing methods and automatic machinery have enabled us to reduce prices on all Amcoil units.

Prices effective as of April 1, 1945 and supersede all previous lists. They are subject to change without notice.

COMPARE OUR QUALITY — DESIGN — NEW INVENTIONS — IMMEDIATE DELIVERY

FOOD CONDITIONER COOLING UNIT

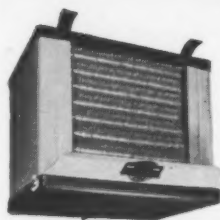
Automatically preserves foods without dehydration. Temperatures from 36° to 40° F. For reach-in and walk-in coolers.



MODEL	BTU/HR 15° MTD	LIST PRICE
RIF 38	4,600	\$270.00
RIF 43	5,500	283.00
OCF 56	6,500	290.00
OCF 82	9,200	325.00
OCF 126	13,000	550.00
OCF 166	19,500	590.00
FC 56	7,500	333.00
FC 80	11,300	378.00
FC 130	17,000	601.00
FC 160	22,600	641.00

ALSERVICE OPEN FACE UNIT

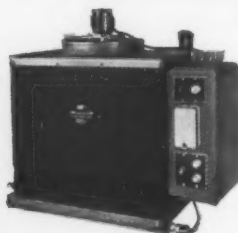
For efficient cooling and serves as a general utility unit in preserving foods where a forced draft cooling unit is required. Streamlined, in attractive grey and black colors, it produces temperatures down to 36° F.



MODEL	BTU/HR 15° MTD	LIST PRICE
OC 44	4,000	\$120.00
OC 48	5,100	148.00
OC 58	7,500	161.00
OC 84	11,000	210.00
OC 128	15,500	322.00
OC 168	23,000	370.00

ZERO-BREEZE LOW TEMP UNIT

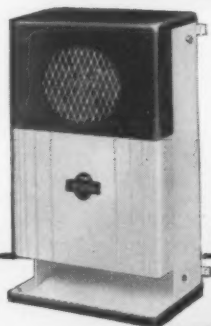
A low temperature unit equipped with automatic electric defrost . . . wall-mounted model . . . produces temperatures from +20° F. to -20° F. . . defrosts automatically on each off-cycle of condensing unit.



MODEL	BTU/HR 10° MTD	LIST PRICE
RZB 60	3,900	\$325.00
ZB 120	7,250	425.00
ZB 150	11,800	615.00
ZB 180	14,500	655.00

ALSERVICE REACH-IN PANEL UNIT

A compact cooling unit for all utility refrigeration applications. Designed to meet a growing demand for medium capacity units to balance condensing units of 1/4, 1/2, 3/4 or 1 HP. Especially adapted for reach-in and small walk-in boxes.



MODEL	BTU/HR 15° MTD	LIST PRICE
RI 15	2,000	\$ 94.00
RI 25	2,250	99.00
RI 30	3,000	114.00
RI 40	5,250	149.00
RI 45	6,150	169.00

ALSERVICE DOWN-DRAFT UNIT

An efficient, down-draft cooling unit employing new ideas in refrigeration. . . May be converted to controlled humidity Food Conditioner by adding the control assembly package.



MODEL	BTU/HR 15° MTD	LIST PRICE
UC 63	8,000	\$211.00
UC 100	12,300	261.00
UC 123	17,500	477.00
UC 200	24,000	517.00

Each of these AMCOIL models are now available and can be purchased from your jobbers' stock, or can be shipped from our factory. Please enclose priority MRO or AAS under limitation order L38 with your order. **READY FOR IMMEDIATE DELIVERY.**

LICENSED UNDER

Latent Cold Patent
Patent Pending

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J. E. Oliphant & Co., 305 Unter Side, Marion, Ohio
Richard Barthelme Sales Co., 1711 Challen Ave., Jacksonville, Fla.
F. M. Eversden & Associates, 220 So. 16th St., Philadelphia 2, Pa.
Jordy Engineering Co., Inc., 813 Howard Ave., New Orleans 13, La.
P. J. Burrell, 800 North Clark St., Chicago, Ill.
Robbins-Greenwood Co., 3104 Main St., Houston 4, Texas
The Mac Silver Co., 114 No. Sweetzer Ave., Los Angeles 36, Calif.

AMCOIL



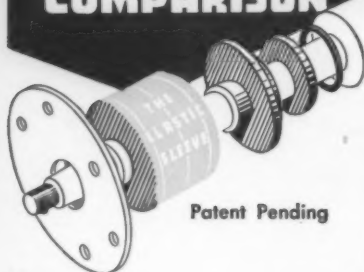
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25-27 LEXINGTON STREET • NEWARK, N. J.

Cable Address—AMCOIL

CUT THIS ADVERTISEMENT FOR YOUR FILES • WRITE FOR CATALOGUES AND PRICE LISTS No. 8

A New STANDARD OF COMPARISON



Patent Pending

"The Seal of Approval"

The immediate acceptance by some of industry's most important engineers has justified our slogan.

The ELASTIC SLEEVE will do a better job on any rotary shaft for it is extremely flexible, oil resistant and retains its resilience.

- Works equally well on worn and pitted shafts.
- Eliminates springs and shims.
- Fits your present compressor end plate.
- Is assured of proper lubrication.
- Is easy to install as a replacement seal.
- Features the sensational "O" ring between the shaft end and the worn shaft.

If your jobber can't supply you, order direct, include your jobber's name and address.

WRITE FOR THIS FOLDER



Learn the facts. Compare the features of the "Seal of Approval" by writing for your free copy of this illustrated and fully descriptive folder NOW!

TEMPERATURE

Control Devices



Over the COUNTER

THE other day when Tim Donnelly came in to pick up an order of parts for his shop, we got to talkin' about new help, training the returning soldier and so on. Tim's got a pretty fine shop—about 8 or 9 men—and he does a nice business. Maybe passin' along Tim Donnelly's ideas will give you a new slant on your own operations. Anyway, here's Tim's story:

"We get a new man in for the repair shop and know doggone well he's not had much experience, but from the way he handles himself we figure he'll pan out. Bein' short-handed, we put him with one of the old shop hands for a couple of weeks and then send him out on his own.

"Had an experience a little while back with one of the new men that sorta put a crimp in our crystal-gazin' on how many new refrigerators we were goin' to sell our present repair customers when 'Uncle' gives the go-ahead. It was the first time the full force of the fact that our repair men are really Donnelly Household Appliances good-will ambassadors, you might say, hit us.

"Well, this new lad I'm tellin' you about had been workin' for us about three weeks when it happened—Mrs. Fink calls me on the phone! He had been to her house that morning to make a compressor repair; he did the job o.k., but accordin' to Mrs. Fink, her kitchen looked like a herd of water buffalo had used it—for their wallow—or whatever it is water buffalos do.

"That set me to thinkin'—was it the new man's fault or was it mine? I didn't want to decide it was my fault right off, so I phoned a half dozen customers that some of our beginners had made repairs for in the past few weeks. They all told me about the same thing; they hadn't called me to complain because they could see that the boys were new on the job. The work was o.k.; but, oh, what a sloppy

impression of Donnelly Household Appliances they left behind them!

"That night, when the men came back to the shop, I got them together in the back room for a little talk. I explained how long we had been in business, and that we hoped to stay in business. Told 'em that we were in the neighborhood to sell and service refrigerators—we hoped to sell a lot of them when the war's over. Told 'em that as repair and service men they were our advance salesmen. Then I gave 'em some of the 'Emily Post stuff' my first boss gave me:

"When you're doin' work in a private home—well, yes, restaurants and such places, too—keep your hands clean. Maybe the floor's just been scrubbed; if so, spread some newspapers where you're working and then your greasy coveralls won't mess it all up.

"When you got the bill made up, don't feel sorry for the customer. Charge all your time—and don't make excuses if the bill runs high. He figures to pay you for your work.

"Don't make major repairs on the job. This belittles your work and shows the customer too much about your business. Bring the work back to the shop—it'll be done better that way, anyhow.

"When you make out your slip for the office here, put on it the make and size of compressor and motor, number of belts and sizes, number of low sides in the cooler, and number of fixtures. This helps us out when the customer calls and says 'Why, your man was out here just last week and now it won't run.' Our records—because of your information—tell us you haven't been out there for months.

"That's all," I told the fellows, "except I'm going to help us all do a better job of servicing—it's time we dropped any 'taken for granted' views we might have had. After all, there'll come a day..."

THE REFRIGERATION INDUSTRY

1½ H.P. condensing unit—retail price, \$660; dealer price, \$396; distributor price, \$330.

Behrenfeld Mfg. Co., Ghent, Minn.: 12 cu. ft. unit, ¼ H.P. condensing unit—retail price, \$380; dealer price, \$228; distributor price, \$190.

Crating charges up to \$6 and actual shipping charges may be added to these prices.

● LOCKER PROMOTION

NATIONAL FROZEN FOOD Locker Association has appointed Sills, Inc., Chicago public relations firm, to coordinate and direct a public relations program for that industry. Announcing the program, Harry Flory, chairman of the association's public relations committee, said it would have these aims:

(1) To present the story of the industry, (2) to stress economic advantages of using locker plants, (3) to correct popular misconceptions about the industry, (4) to render wartime service through promotion of lockers as logical preserving agents for produce of Victory gardens, and (5) to tell the part the industry will play in the postwar world.

● "FREON" FREED

RESTRICTIONS ON DELIVERY and use of "Freon-12" have been dropped by WPB. The long-expected revision of Order M-28 permitting sales of the refrigerator for all types of systems issued on April 2.

Although M-28 now permits sales of Freon-12 for

comfort cooling systems as defined in List A of the order, precedence on deliveries is to be given to more essential uses, according to the WPB revision. List A covers such users as residential buildings, banks, schools, offices, bars, theaters, amusement places, and the like.

The amended order still requires that purchasers certify to the seller and WPB that they do not have any F-12 cylinders belonging to someone else which have been empty more than 15 days, and that the refrigerant will not be used for purposes forbidden by the order.

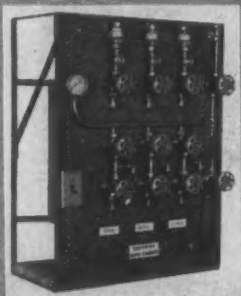
If cylinders are returned promptly, there should be an adequate supply of F-12 available, WPB officials say. Failure to keep cylinders moving, however, may cause restrictions to be put back on.

The amended M-28 provides that cylinders be returned to the supplier as promptly as practicable, unless the cylinders are owned by the person buying the F-12 gas.

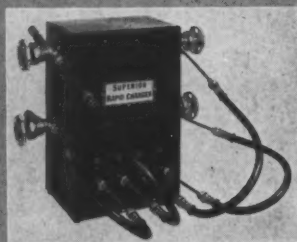
● BRIEFLY TOLD

SEEGER Refrigerator Co., St. Paul, has completed plans for the purchase of Sunbeam Electric Mfg. Co., Evansville, Ind., maker of household refrigeration units . . . Seeger will take complete control of the Sunbeam firm, which will continue to make the Coldspot unit, for which Seeger has supplied cabinets . . . Seeger's normal contract and commercial manufacturing operations would not be affected. New name: Seeger-Sunbeam.

CO-OPS are planning to intensify their refrigeration activities postwar by distributing their own brands . . . National Cooperatives already has signed with a manufacturer to produce a household model, and will spend \$30,000 to \$40,000 on design and engineering work.



TYPE 630—illustrated above, is a complete refrigerant transfer system, with all equipment mounted on a special composition panel.



TYPE 631—illustrated below, is recommended for use where evacuation and discharge, and other facilities provided on Type 630 are not required.

Superior RAPID-CHARGERS

Hi-speed refrigerant transfer systems
five pounds per minute by actual test.

RAPID-CHARGER is the result of careful study of all known refrigerant transfer methods, systems and problems pertaining thereto. It has instantaneous liquid coolers—one for each refrigerant to be transferred—connected in series with a refrigerating circuit, using a thermostatic expansion valve, and a small condensing unit with pressure control.

RAPID-CHARGER is fast—no valuable time lost in filling cylinders—no purging necessary. Refrigerant losses are practically eliminated.

If you haven't a copy of Catalog R2, request one today.

SUPERIOR VALVE & FITTINGS COMPANY

PITTSBURGH - 26 - PENNSYLVANIA

OFFICES IN PRINCIPAL CITIES • WEST COAST STOCK • LOS ANGELES (151) • JOBBERS EVERYWHERE



JARROW PRODUCTS
420 N. LA SALLE ST., CHICAGO 10, ILLINOIS

COLDSPOT . . . Continued from page 16

Take your torch and melt the silver solder joint at the condenser and the suction line at the base. When unsoldering the discharge line as it enters the condenser, extreme care must be used, as the condenser tubes are steel and if excessive heat is used, the tube will break. Remove the small clamp which is used to hold down the oil-cooling line, and the compressor is now ready to be lifted off the base.

Seal off the open lines and wash off the unit with a suitable solvent. Clean the condenser thoroughly with solvent and high pressure air, as fins may be plugged with oily dirt and lint.

After this is done, set the unit on the bench and replace the expansion valve. Under some conditions the soft solder will wash away at these joints and allow water to freeze between the tube and the valve fitting and collapse the tube. If this should occur, cut the tube back several inches and replace. Do not attempt to fill it in with solder and expect good results. Soft solder joints need good close fits for satisfactory service.

The new or rebuilt valve should be

soldered with 95-5 or suitable solder. This is one of the weak spots, and should be soldered with great care. Much trouble has been experienced with water condensing in the bellows of these valves, and experience has proved that for good results and little flare-backs, the best results are obtained by returning the valve to the factory for replacement. Be sure to remove rubber breather cap and disconnect control bulb from evaporator before soldering.

Nearly all controls on Coldspot units are manufactured by General Electric. Dead bellows will give the same reaction as on any other control, and we do not believe it is necessary to go into lengthy discussion of that problem here, as most service men are familiar with the characteristics of controls. There is one model, however, that may give a little trouble. It can be easily identified, as the control knobs are set farther apart, and both knobs just slip on to their respective shafts on the control. For some reason, the parts of the control corrode and fall apart.

Check Control Screws

The screw connections on the back of the control are sometimes corroded, so be sure to check for an open at this point. In our opinion, it would be preferable to send the control back to the factory if such symptoms occur, rather than attempt to patch it up. On some G-E controls, the composition of the plastic case is such as to cause corrosion of the internal parts. Oiling it is only a temporary repair. Do the job right.

Remove all the cap screws holding the compressor dome and wash out with solvent. Be sure to remove all gasket material left on either the dome or the compressor casting. The oil left, if any, is usually carboned up, and may have to be cleaned out with steel wool.

Take the oil screen off, unscrew the muffler, and wash each carefully. Remove the discharge muffler and back bearing plate. Before taking the cylinder off, mark the end of the shaft opposite one of the valve slots with a small triangular file. Now take out each vane and place them on the bench in the order removed, so they can be installed again in the correct slots. Some compressors have the vanes numbered, and if this is the case, the base of the slots are numbered also. This will simplify the dismantling of the pump.

**HE'S RUNNING
AWAY FROM
A WET
SITUATION,
but . . .**



. . . the grim urgency of the matter will bring him back to finish the job.

Unlike the retreating youth, the wise refrigeration service engineer on a moisture case would simply reach for the TZ and, in nine out of ten cases, the trouble would be over in short order. He wouldn't have to come back. He'd be on his way to the next call.

Time-saving, gasoline-economizing, profit-paying TZ is waiting for the progressive engineer at the store of the live jobber. Stock it today.

"The Moving Dehydrant"

THAWZONE
Fully Protected by U. S. Patent
The PIONEER FLUID DEHYDRANT

**HIGHSIDE
CHEMICALS CO.**

195 Verona Ave.,
NEWARK 4, N. J.

(The vanes are numbered counter-clockwise, looking from the back end of the pump.)

The cylinder and shaft can now be removed. The seal is screwed on to the shaft with a right hand thread, and holes are provided for its removal. If the seal is in tight, it may be damaged beyond use before it can be removed. If such is the case, take the two mounting spring nuts and lock them on the seal. The rotor can be clamped in a vise, using leather belting to prevent marring, and the seal unscrewed.

If the seal is to be re-used, lap the seal bellows on a plate with polishing paper and kerosene until a smooth finish is obtained.

Compressor Bearing Face

The bearing face on the compressor casting presents another problem. Do not use polishing paper or grinding compound to lap the face in, as the compound will imbed itself in the soft bronze and score the seal in a short time.

In order to overcome this, obtain two round discs of plate glass about 1 inch to 1 1/4 inch in diameter. Make a paste of No. 200 and No. 600 alundum and oil, and place a dab between the two plates. Lapping the two plates together will provide an etched surface. Wash them off carefully, and then use the etched surface to lap the bearing face smooth.

Caution must be used when lapping, so that a rounded surface is not obtained. These plates may have to be lapped several times before the face is smooth. Lap the plates first with No. 200 alundum and use them for the initial work on the seal face. For the finish, use the No. 600 alundum on the plates. If your time is limited, there are replacement seals on the market, and good results can be obtained if the manufacturers' directions are followed explicitly.

Use Caution When Lapping

On some models, the cylinder intake port consisted of two slots in the cylinder in the direction of the pump rotation. This left corresponding high spots on the vanes. By careful lapping, these high spots can be removed, and the pump will run very quiet, as these high spots are a source of noise, causing a rattle when the compressor is running. Use caution when lapping!

All parts should be washed carefully to avoid nicks or scratches. The cylinder will sometimes score, and these score lines can be removed with polishing paper and kerosene. Remove all traces of carbon and polish all bearing surfaces before assembly.

In the suction port of the cylinder is a fine mesh screen. For best results, remove this screen and leave out of pump. The reason for this is that, in a large number of cases, the screen will unravel and cause the compressor to stick. In most compressor stickups this is the cause, rather than corrosion. There are very few stickups on

Coldspot compressors due to moisture.

If the original seal is used, moisten the bearing and seal surfaces with clean refrigerator oil and assemble. Use a chamois for all wiping of parts. The cylinder is then oiled and assembled with the locating pin in the correct hole.

If the compressor casting is clamped in a vise so that the pump will be in the same position as it is on the unit, the locating pin will be in such a position as to let the cylinder fall to its own original position. Next, install the vanes in their origi-

Service Engineers Should Know...



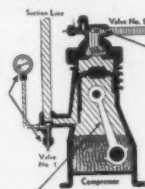
How to prevent refrigerant loss and lubrication troubles when open type machines are sent to storage or are shut down for extended periods.

This is what may happen when open type systems remain idle:

- A: Exposure to high temperatures may create crank-case pressures high enough to weaken the shaft seal; result — refrigerant leaks out.
- B: Exposure to low temperatures may condense refrigerant vapors in the crank-case — oil is diluted to cause foaming and oil pumping when machine is started again.

Here is the procedure to prevent the conditions under A and B.

- 1 Attach compound gauge to the plug port of Valve #1, then turn valve stem all the way in to cut off suction line.



- 2 Pump crankcase pressure down until a constant pressure of 2 or 3 lbs. per square inch is maintained; stop compressor.

- 3 Turn stem of Valve #2 all way in cutting off line to condenser. Remove compound gauge, bleeding remaining pressure to zero. Replace port plug securely.

- 4 Be sure to disconnect electrical current if the machine is not to be moved.

Manufacturers of "Virginia" Refrigerants and Agents for Kinetic's "Freon-12"—"Freon-22"—"Freon-11"



VIRGINIA Smelting Co.

WEST NORFOLK, VIRGINIA

76 BEAVER ST., NEW YORK 6 N.Y. 131 STATE ST., BOSTON 4

This Spring and Summer
Let the Handy, Portable
SUPER-WELDER
Help You Make More Money
Handling Jobs You Couldn't
Take Before



Only
\$19⁹⁵
Complete
With Carrying
Case \$22.50

It's easy, safe, profitable to have one of these complete SUPER-WELDER outfits as a ready-to-go-to-work assistant. Do all types of welding and brazing on all kinds of metals—iron, steel, brass, copper, aluminum, etc. Perfect results on light work. Simple instructions show you how to make the best professional use of this all-purpose welder. Operates AC-DC, 110 Volts. Plugs in any outlet. Complete with all supplies, etc. Guaranteed 1 year.

FREE EXAMINATION for 5 DAYS
Money Refunded If Not Completely Satisfied

SUPER-WELDER MANUFACTURING CO.
Dept. RI, 23 East 20 St., New York 3, N. Y.

nal slots, with the numbered surfaces toward the bottom of the slot. When the back bearing is put on with the four machine screws, the plate and the cylinder will line up flush when installed properly.

Now comes the tough part. In order to obtain the correct seal between the rotor and the cylinder, the closest possible clearance without undue friction will give the best results as far as efficiency is concerned.

To do this, hold the cylinder down gently against the rotor while tightening up the four screws. After this is done, test the assembly by screwing the coupling on to the seal. The entire assembly should turn easily without any binding if installed in the above manner. Fasten the oil screen in place and screw the discharge muffler in securely. When this is done, the dome is ready to be bolted back in place.

(Editor's Note: This is the first of two articles by Mr. Wiedwald on the repair and rebuilding of Cold-spot units.)

SUNROC SEEKS NATIONAL WATER COOLER SALES

The Sunroc Refrigeration Co., Glen Riddle, Pa., announces the completion of its plans for the national distribution of its line of electric water coolers.

Sunroc has had exclusive listing, for all types and sizes of electric water-coolers, in the government's general schedule of supplies, for over eight years. Since Pearl Harbor, its



production has been devoted almost exclusively to units supplied to the Navy, Army, and the U. S. Maritime Commission.

These heavy-duty Coolers, built to Government specifications, are duplicated for the aviation trade. The same standards of construction and inspection will be maintained, and the company will confine its activities to the manufacture of water-coolers.

Sunroc is initially offering for sale the three basic models in greatest demand, equipped with bubblers and glass fillers. As manpower and materials become more abundant, a bottle-cooler, and additional models, will be added to round out the line.

All advancements due to war-time research and manufacturing experience are incorporated in current models, and the entire line is being restyled by expert designers.

SCHAEFER APPOINTS CHICAGO OUTLET

Stromberg-Carlson Co.'s Chicago branch office has been appointed as distributor for "Pak-A-Way" home and farm freezers, it has been announced by the manufacturer, Schaefer, Inc., of Minneapolis. Franchise includes the entire greater Chicago area, 40 counties in northeastern Illinois and three counties in northwestern Indiana.

VISOLEAK FINDS 'EM



RED SPOT FURNISHES CLUE TO REFRIGERANT LEAK DETECTION

VISOLEAK is a finely-treated colored refrigerant oil which penetrates every nook and cranny of the system. The leak is indicated by a red stain—similar to the discoloration on a carburetor in which ethyl gasoline has been used. Can be used safely and effectively with any type of refrigerant. See your jobber today. If he has not stocked Visoleak write for complete information.

WHOLESALE PRICES		CASE LOTS	
4 ounce bottle	\$ 1.00	48 bottles	
8 ounce bottle	1.75	24 bottles	
1 pint bottle	3.00	24 bottles	
1 quart bottle	5.00	12 bottles	
1 gallon can	16.00	6 cans	
SAVE 10% ON CASE LOTS			

WESTERN THERMAL EQUIPMENT CO.

5141 ANGELES VISTA BLVD.
LOS ANGELES 43, CALIF.

PIONEERED IN THE WEST!



Heat Exchange Equipment Sets New Performance Records

d-h engineers have designed and manufactured a complete line of heat transfer equipment whose performance in service is setting new high standards of excellence throughout the country. Included are heaters, coolers, air conditioning equipment coils...each with outstanding qualities that invite comparison.

They represent more than a generation of Western development. Into every d-h unit go thorough knowledge of heat exchange principles... expert designing for proper proportion and balance...experience in manufacturing quality products with the finest factory facilities.



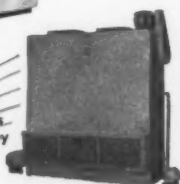
SPASAVER
Horizontal type air cooler
first introduced by d-h



HEXHEAT
Airplane exhaust heater
a leader in its field



STRATA-FLO
Revolutionary type water cooler
of unequalled efficiency



WAT-R-MISER
Evaporative liquid
cooler that eliminates
nine tenths of ordinary
operating costs



drayer-hanson INC.
738 EAST PICO STREET • LOS ANGELES 21, CALIFORNIA

THE FIRST AND ONLY FACTORY OF ITS KIND IN THE WEST WITH COMPLETE FACILITIES FOR ENGINEERING, DESIGNING, MANUFACTURING, HEAT EXCHANGE EQUIPMENT

Electrimatic Regulating Valves

Automatic control and regulating valves for Freon, Methyl Chloride and Ammonia. A large variety of sizes and types available for practically any refrigeration requirement.



WL water regulating valves for Freon, Methyl, or Sulphur. $\frac{3}{8}$ " orifice and $\frac{3}{4}$ " FPT. Brass body construction. Large capacity—no chatter.

WP water regulating valves are available in $\frac{3}{8}$ ", $\frac{1}{2}$ " and $\frac{3}{4}$ " FPT sizes. Brass body construction for Freon, Methyl or Sulphur. Easy adjustment.



WK water regulating valves are De Luxe Pilot Operated Modulating valves. Iron body, simple adjustment. Available in sizes ranging from $\frac{3}{8}$ " to 2" FPT.

WR regulating valves for Ammonia are diaphragm operated and highest quality corrosion resistant materials are used. Available in sizes ranging from $\frac{3}{8}$ " to 2" FPT.

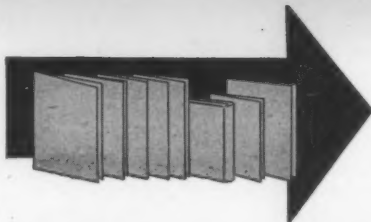


Electrimatic valves are individually tested for efficient, economical operation. Trouble free performance.

Ask for a copy of our latest catalog today.

Electrimatic

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Useful Literature

The publications featured on this page were written by experts. They are FREE publications. To obtain these write to THE REFRIGERATION INDUSTRY, 812 Huron Road, Cleveland, 15, Ohio. If there is some delay in receiving the material requested, please understand that this is due to our operating with a minimum staff. We shall put through all requests as rapidly as possible.

147—Drafting Aids . . . Two folders issued by Charles Bruning Co., Inc., Chicago, the first describing Dulseal, a transparent film for protecting and preserving tracings, drawings, blueprints, etc., and the second an adjustable triangle for use by engineers and draftsmen.

148—Cabinet Lathe . . . Information on a new, compact cabinet lathe developed by Logan Engineering Co., Chicago, and other lathes produced by this company.

149—Solder-Backed Contacts . . . A new folder, issued by Gibson Electric Co., Pittsburgh, covering silver-solder-backed contacts for brazing. Construction and methods are outlined in detail, standard forms and sizes, typical assemblies are illustrated. Catalog C-11.

150—Punch Press . . . Details and prices on a new open face all-purpose punch press developed by Maxant Button & Supply Co., Chicago.

151—Bulletin . . . A six-page bulletin issued by Kramer Trenton Co. describing its "Thermobank" automatic system for freezing temperatures, without the use of brine or water spray or automatic heaters. Bulletin describes operation of the system, shows a typical hook-up and includes dimensions and fittings and performance data.

152—Motor Selector Guide . . . Booklet prepared by Dumore Co. for design and production executives describing methods of selecting correct type and size of fractional horsepower motors for any application. Data is presented in outline

style; comparative characteristics of various types of motors are also shown.

153—Electric Timer . . . New electric timer bulletin (No. 1100) released by C. H. Stielting Co., Industrial Div. Describes table and wall model stop clocks, combination timers and impulse counters, and other timing devices. Includes circuit diagrams.

154—Varnishes . . . Booklet issued by Dow-Corning Corp. describing properties of DC 993 Varnish and outlining recommended procedures in applying this Silicone product to the insulation of electrical equipment.

155—Line Filters . . . Literature prepared by Mueller Bros. on its A-13661 line filter, for use in various refrigeration applications.

156—Oil Separators . . . Descriptive bulletin and prices on various models of its "Oilrite" automatic oil separators. Available in capacities from 1/6 H.P. to 60 tons. Available from Temprite Products Corp.

157—Refrigeration Equipment . . . Three new bulletins (C-58, C-68-C and C-14-M), available from Curtis Refrigerating Division, describing its lines of products for refrigeration and air conditioning.

158—Protective Masks . . . A bulletin (#605) issued by Chicago Eye Shield Co. describing its "Healthguard" Fume Kit for use by refrigeration service men.

159—Home Freezers . . . Information on its complete line of cabinets and walk-in freezers, sized from 5 to 120 cu. ft. Available from Amara Society.

MAIL THIS COUPON FOR FREE LITERATURE

Refrigeration Industry, 812 Huron Road, Cleveland 15, O.

I should like a copy of the literature listed below:

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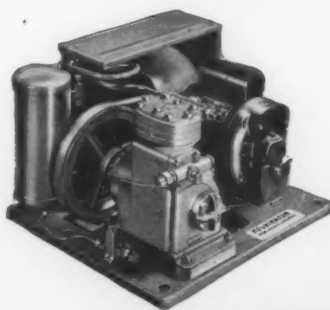
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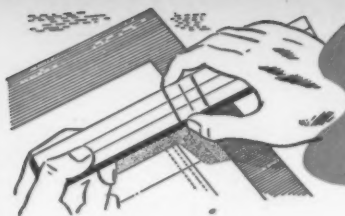


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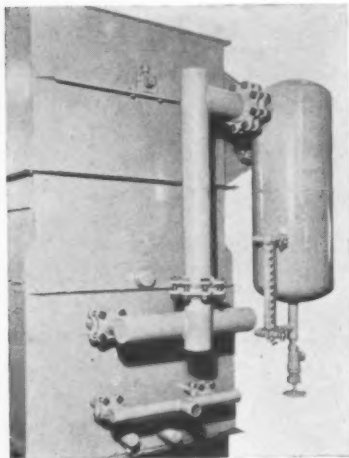


New PRODUCTS

Oil Removal Method

A new method of removing oil from refrigerant gas is offered by the Niagara Blower Co. as a part of the Niagara "Duopass" aero condenser.

The new apparatus, called the Niagara "Oilout," uses a cylindrical drum located at the outlet of the Duopass coil so that the refrigerant gas enters with a tangential motion. More oil is said to be removed by this method because the Duopass coil has reduced the temperature of the gas so that the oil vapor has been condensed.



Expansion of the system from a 4" pipe to a 14" drum (in the model illustrated) reduces the velocity of the gas so that the oil is easily removed and held by the wall and separator plates of the trap. A sight gauge and valve for draining the oil are provided. Removing oil from refrigerant gas in this manner greatly improves the efficiency and capacity of a refrigeration system, it is claimed. The "Oilout" is protected by U. S. patents.

Pipe Joint Compound

Lake Chemical Co., Chicago, announces "Pipetite-Stik," pipe joint compound in handy, easy-to-use stick form. All that is necessary is to rub three or four strokes of stick across

pipe threads, the company says. It spreads and fills threads when turned. Encased in a convenient cardboard holder, the stick may be carried around in a pocket or tool kit.

Features claimed for the product are: Unaffected by air, water, steam, acid, gas, brine; lubricates and completely seals pipe joint threads, nuts, bolts, gaskets, turn-buckles; prevents rusting; withstands vibration, temperature changes, deflection, pressure; increases thread life; contracts or expands with the pipe.

Power Booster

The HP-16 Power Booster, latest development of the Talk-A-Phone Electronic Laboratories, enables the busy executive to now have both his office and factory at his fingertips without going through the central switch-board.

The HP-16 is capable of delivering a minimum of 15 watts "voice range" power. This is more than sufficient to cover the average paging system requirements. More than one booster can be used in a system where greater power levels are necessary. In addition, special type speakers are available for use when necessary.

The booster will work with the majority of inter-communication systems. Model illustrated measures 6" x 12" x 6 1/4" high. The unit is equipped with "on-off" switch, "pilot light" indicator and variable "volume control." Operation is on 110 volts AC, 60 cycles.

Open End V-Belting

Addition of an "A" section to its line of open end V-belts is announced by The B. F. Goodrich Co. Widely used where endless V-belts do not meet the requirements, the company's open end V-belting is now available in four standard sections of the same cross sectional dimensions as endless V-belts, allowing use of standard sheaves.

These sizes are the "A" with 1 7/32" top width and 5/16" thickness; "B" with 2 1/32" top width and 1/16" thickness; "C" with 7/8" top width and 5/8" thickness; and "D" with 1 1/4" top width and 3/4" thickness.

Extension of the application of open end V-belting has been made possible by development of a new fastener named "Flex V" by the Flexible Steel Lacing Co.



Adjustable Hose Clamp

An improved worm drive (Wittek Type WWD) hose clamp announced by Wittek Mfg. Co., Chicago, made to specification AN-FF-C-406A incorporates a new feature, an inner band of stainless steel which (1) protects the hose from the serrations in the outer band, and (2) distributes the load uniformly to provide greater strength and superior sealing characteristics. Made of stainless steel and designed to take full advantage of the superior physical properties of that material, the hose clamp has compact streamlined housing and hardened one-piece thumbscrew. It is available in eight adjustable sizes to cover the entire range of applications.

Refrigerated Rooms

The Lockerator line of prefabricated walk-in and reach-in refrigeration rooms has been placed on the market by Stoddard Mfg. Co., Mason City, Iowa. Rooms of almost any size, it is said, may be made by a combination of the various standard size sections, which are assembled with lock bolt joints.

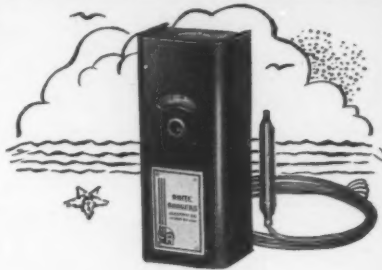
Display service coolers have white steel fronts and triple glass service windows, while the standard storage units are of wood construction finished in synthetic enamel, minus the reach-in windows. Standard equipment in all models includes meat rails and a shelf, as well as hardware. All models are available with refrigeration equipment installed and ready to plug in.

NOT AFFECTED BY ★ ATMOSPHERIC PRESSURE...



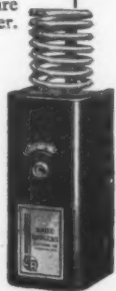
In the stratosphere or at sea level, in a mile-high airplane or on a tropical isle, White-Rodgers Hydraulic-Action controls *never* need adjustment or recalibration.

The completely sealed solid-liquid charge of the Hydraulic-Action element is tested before it leaves our plant, and will perform as calibrated no matter where you install it.



8 EXCLUSIVE FEATURES OF WHITE-RODGERS HYDRAULIC-ACTION TEMPERATURE CONTROLS

1. May be mounted at any angle or position, above, below or on level with control point.
2. Hydraulic-Action principle incorporating solid-liquid filled bulb and capillary provides expansion force comparable to that of a metal bar.
3. Diaphragm motion uniform per degree of temperature change.
4. Power of solid-liquid charge permits unusually sturdy switch construction resulting in positive contact closure.
5. Heavier, longer-wearing parts are possible because of unlimited power.
6. Dials are evenly and accurately calibrated over their entire range because of straight-line expansion.
7. Controls with remote bulb and capillary are not sensitive to change in room temperature. Accuracy of control is not affected by temperature changes in surrounding area.
- ★ 8. Not affected by atmospheric pressure. Works accurately at sea level or in the stratosphere without compensation or adjustment.

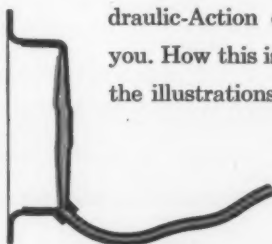


NO MATTER WHERE YOU PUT THEM HYDRAULIC-ACTION CONTROLS ALWAYS ARE ACCURATELY CALIBRATED



CONTRACTED

Above is a cross section of the diaphragm and part of the liquid-filled capillary. In this view the liquid has contracted, releasing the pressure on the diaphragm and causing the switch contacts to function.



EXPANDED

In this cross-sectional view, the liquid charge of the capillary has expanded with a rise in temperature. The positive force of this hydraulic action forces the diaphragm outward and causes the switch contacts to function.

Actual-size illustration of the White-Rodgers diaphragm body, the actuating element of every White-Rodgers temperature control. It is so designed as to exert full pressure at the point of contact with the switch mechanism.



WHITE-RODGERS ELECTRIC CO.

1225E CASS AVENUE

ST. LOUIS 6, MISSOURI



Controls for Refrigeration • Heating • Air-Conditioning

Lock and Stop Hinge

A new lock and stop hinge designed specifically for low temperature chest type refrigerators has been introduced by the National Lock Co., Rockford, Ill., manufacturer.

Open Blade Switch

A small single pole open blade switch designed to solve many installation problems is announced by Acro Electric Co., Cleveland. It is smaller in size and requires less operating pressure.

The overall dimensions are approximately $2\frac{1}{32}'' \times 1\frac{1}{16}'' \times 2\frac{3}{4}''$. Contact arrangements are for normally open, normally closed or double throw circuits. Being an open blade switch, the means of actuation is provided by the user.

Tests of these switches have shown a mechanical life expectancy of more than ten million operations. Standard operating pressure at the end of the blade is only 3 to 6 oz. Rated at 15 amp., 115 volts A.C.

Wire Stripper

An inexpensive wire stripper for cleaning cotton and enamel, silk and enamel, string asbestos and similar types of light insulation, is announced by the Ideal Commutator Dresser Co.

Round, flat or rectangular wire, solid or stranded, any length, may be stripped. It is especially suited for cleaning fine "Litz," "Formex," "Formvar" wire and fibre glass insulation.

The two wire cleaning brushes are positively driven, being mounted directly on the end of separate motor shafts. The right hand motor is mounted on a pivoted base and is normally held up by a spring. This keeps the brushes apart, except when stripping wire, so that brush life is increased.

Brushes are made in sections of special steel wire ground to size. Each section is replaceable as it becomes worn.

Nut Type Switch

A new nut-type switch with a double break feature for panel mounting installations has been announced by Acro Electric Co., Cleveland. It is recommended where compactness and ruggedness are required in a limit switch.



FOR ALL TYPES OF REFRIGERATORS

ANSUL

ICE-X

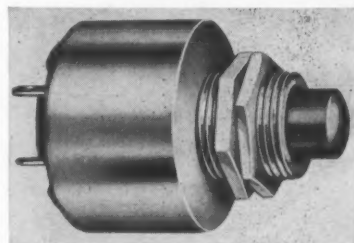
ICE-X quickly cures emergency freeze ups when ice forms at the expansion valve or capillary tube. Harmless to use. Great for Freon, Carrene, or Methyl Chloride systems... The dependable liquid anti-freeze.

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Case is of cadmium plated brass with a sturdy threaded sleeve 15/32-32, carrying two locknuts. Heat treated beryllium springs and fine silver contacts are said to assure high current capacity and long life. The unit is actuated with a bakelite plunger, and strong shorting bar construction is an additional feature claimed.

Rating of the unit is 15 amps. at 115 volts AC. The switch is made in two pressure ranges of 10-15 ozs. and 16-24 ozs., with pretravel approximately $\frac{1}{32}$ -in. and overtravel $\frac{1}{64}$ -in.



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QUARTERMASTER CORPS VETERAN is interested in making start in refrigeration. No previous experience, but willing to learn. Main interest is in retail business with service sideline. Box 4556, Refrigeration Industry.

HELP WANTED

Refrigeration service man with knowledge of commercial and Air Conditioning. Department of expanding organization in Boston, Massachusetts. Good pay plus commission plus car allowance. Give full detail about yourself and your experience in first letter. Box 5451, The Refrigeration Industry.

AMINCO OIL SEPARATORS



Aminco Oil Separators protect compressors by maintaining correct oil level in crankcase and by excluding oil from refrigerant stream they enable coils, condensers, valves and dehydrators to function most efficiently.

These oil separators are made for jobs from 1/4 H.P. to 120 tons and are used everywhere, ashore or afloat, where efficient refrigeration is desired.

Full descriptive bulletins on request.

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High class parts and service department manager wanted. Will teach you the business from the service and engineering angle. Roy Keir Refrigeration Service, 118 Fresno Ave., Modesto, Calif.

WANTED: Design and production engineer for Refrigeration Cabinets. Experience with low-temperature cabinets preferred. Permanent position. Exceptional opportunity for advancement with one of industry's leading firms. Capable of earning above

\$6,000 a year. Wanted immediately. Write giving full particulars. Replies held strictly confidential. Refrigeration Division, Amana Society, Amana, Iowa.

I have an opening for two or three good refrigeration service men—must be good. Mostly commercial. Work on weekly basis. Roy Keir Refrigeration Service, 118 Fresno Ave., Modesto, Calif.

FOR SALE: Large stock of refrigeration parts, new condensing units, tubing, motors, valves, blower coils, controls, gauges, etc. No priority necessary. Will sell entire lot below cost. Lot \$1,500.00 Write or wire for inventory list. Wm. E. Anglin, 518 Casselberry Ave., Evansville, Ind.

The triple-action DFN System insures 100% protection against moisture, sediment and acid. It stays on the line longer. It is easier, faster to service. Costs less to maintain. When you get all that in *one* unit, why settle for less in a series of units?

The DFN System comprises an inexpensive cartridge quickly installed in an outer shell that is used again and again. Mechanically-packed, hermetically-sealed DFN Cartridges are easily replaced, provide full-strength dehydration because, unlike loose drying agents, they do not adsorb moisture from the air while being serviced.

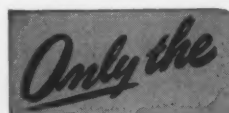
An exclusive DFN strainer and filter assembly covers the *complete area* of the outlet and inlet with multiple layers of wire mesh, bronze wool and felt . . . holds more sediment without pressure drop . . . filters to minute size. Ask your distributor or write us for Catalog R-7.

Standard DFN Demountable Dehydrator shell and cartridge assembly for flexible line installations.



DFN Angle Type Demountable Dehydrator for sweat tube or rigid lines. Cartridge quickly replaced without removing unit from line.

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Today, in towns all over America refrigeration service engineers are doing an outstanding maintenance job of keeping refrigerated display cases, ice cream cabinets, food storage lockers and the countless other applications of refrigeration running smoothly and efficiently.

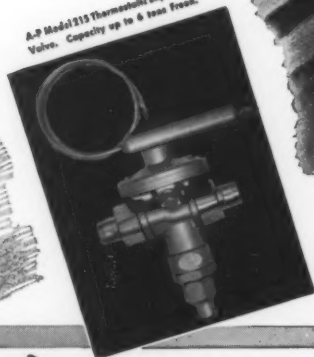
On call the refrigeration service engineer performs his task, oftentimes while the city sleeps. Thousands of dollars he has saved retailers, countless thousands of pounds of precious food he has prevented from spoiling.

These men rely upon A-P DEPENDABLE Refrigeration Controls. They use A-P DEPENDABLE Refrigeration Controls to help them perform their important task. As many of them write "I use a lot of A-P Controls and never had one fail me yet."

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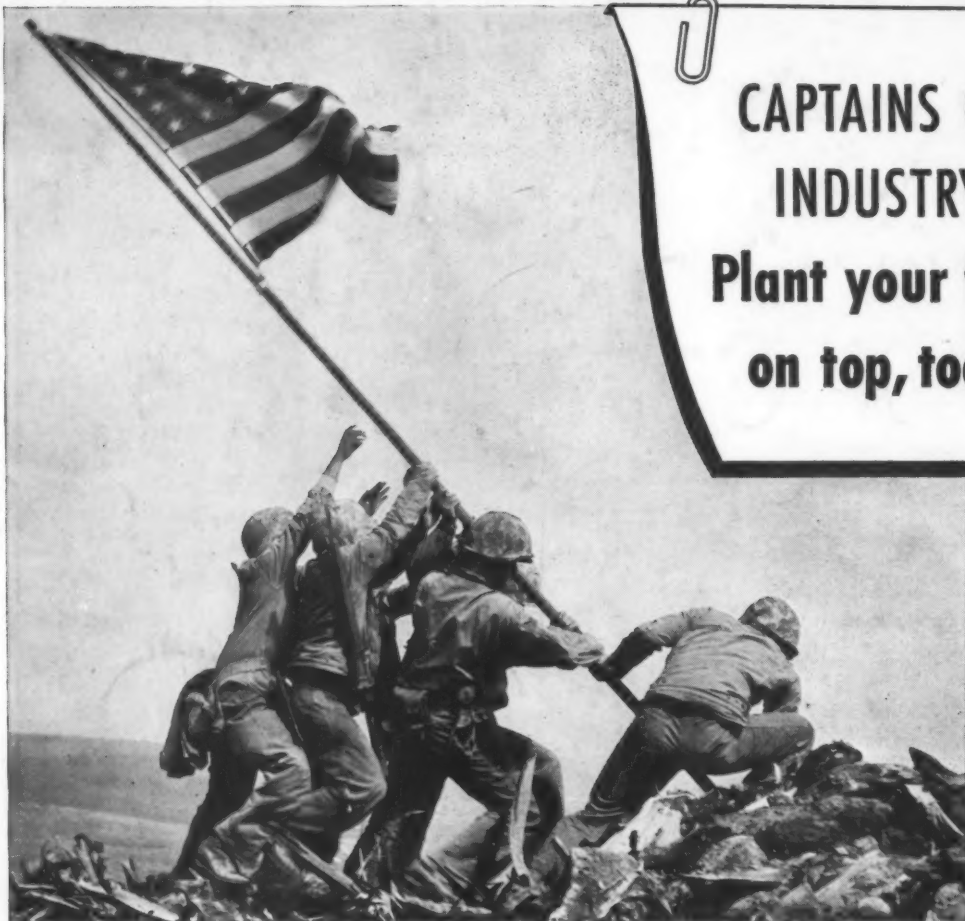
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*Check List***

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- ★ Get your copy of the "7th War Loan Company Quotas" from your local War Finance Chairman. Study it!
- ★ Determine your quota in E Bonds—the backbone of every War Loan.
- ★ Arrange for plant-wide showings of "Mr. & Mrs. America"—the new Treasury film.
- ★ Distribute "How to Get There"—a new War Finance Division booklet explaining the benefits of War Bonds.
- ★ Circulate envelopes for keeping bonds safe.
- ★ Display 7th War Loan posters at strategic points.
- ★ And—see that a bench-to-bench, office-to-office 7th War Loan canvass is made.

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